WAGE EARNINGS OF CHINESE IN THE UNITED STATES:

INDIVIDUAL AND CONTEXTUAL DETERMINANTS

A Dissertation

by

BIBIN QIN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2005

Major Subject: Sociology

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Approved by:

Chair of Committee, Dudley L. Poston, Jr.
Committee Members, Mark Fossett
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ABSTRACT

Wage Earnings of Chinese in the United States:

Individual and Contextual Determinants. (December 2005)

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The objective of this dissertation is to identify both individual and contextual characteristics that may affect the wage earnings of Chinese in the U.S. labor market. The major individual characteristics include education, labor experience, and English ability; the contextual factors include percent of Chinese Americans, percent of Asian Americans, percent of nonwhites, percent of Chinese-owned businesses, occupational and residential segregation between Chinese and whites, and unemployment rate.

Using the combined data of one percent and five percent 2000 Public Use Microdata Samples for 70 metropolitan areas, hierarchical linear models (HLM) were run for three groups of Chinese: native-born, foreign-born U.S. citizens, and foreign-born non-U.S. citizens. The results show that the returns to education are highest for the native-borns but lowest for the non-U.S. citizens. A command of good English benefits recent immigrants more than the native-borns. Labor experience tends to bring positive gains to both native-born and foreign-born U.S. citizens but shows no effects on earnings

of foreign-born non-U.S. citizens. The results support both the human capital and assimilation perspectives.

The HLM results indicate that occupational segregation from majority whites tends to impose a strong and negative effect on the earnings of native-born Chinese; a higher percentage of Chinese-owned businesses tends to increase the earnings of only foreign-born U.S. citizens; unemployment rate is likely to depress the wage earnings of the foreign-borns but not the native-borns. This suggests that Chinese workers with a different immigration history face the labor market differently. Residential segregation, percent of Chinese Americans, percent of Asian Americans, and percent of nonwhites, do not show any direct effects.

Occupational segregation, the percent of Chinese-owned businesses, and the representation of the Chinese population are found to impact earnings indirectly through the individual characteristics. All these findings suggest that contextual factors do not necessarily impose direct effects on wage earnings; however, they may transfer their effects onto earnings via individual characteristics.

This study represents an attempt to bring new insights into earnings attainment models and an addition to the meager body of knowledge concerning both individual and contextual factors that may affect the earnings process of a minority group in the United States. The strengths of using the HLM techniques, the limitations of the study, as well as issues for future study, were also discussed.

DEDICATION

To my parents

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CHAPTER I

INTRODUCTION

Research concerning the socioeconomic attainments of Asian Americans is relatively scarce when compared to studies on the whites, African Americans, and Hispanics (Chiswick 1983; Sakamoto and Furuichi 2002). This paucity may be due to Asian Americans' small share of the U.S. population (Xie and Goyette 2003). Even when they are included in an analysis, the Asian groups are usually lumped together, disregarding their diversified cultures, languages, and immigration histories. As a result, conclusions based on studies of whites or blacks are often limited in that they cannot be readily generalized to the Asian American population. Moreover, because those conclusions are often based on a single lump-summed population, they may not necessarily be applicable to specific groups of Asian Americans. Other studies show that Asian American groups are heterogeneous both in composition (Gardner, Robey, and Smith 1985; Barringer, Takeuchi, and Xenos 1990) and in their socioeconomic attainments (Chiswick 1983; Poston 1988; Poston and Jia 1989). Consequently, separate analyses are needed for each of the Asian groups in the United States in order to obtain a true picture of its earnings attainment.

As will be indicated in the following review, past research on socioeconomic attainment has also tended to focus on individual characteristics and has seldom gone

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This dissertation follows the style and format of the *American Sociological Review*.

beyond this level. Typically, this research tends to examine the association between economic outcomes and personal characteristics such as educational attainment, labor market experience, and occupational status or prestige. Its findings suggest that individual characteristics play important roles in the earnings equation, but they do not fully explain the observed variations in earnings. For example, based on 1980 census data for the San Francisco Bay Area where Asians are heavily concentrated, Cabezas and Kawaguchi's (1988) study provided empirical evidence of the low income and occupational status of many Asian Americans. They found that low returns from human capital investments, rather than deficient investments account for most of the inequality in income. This finding suggests that attention be directed at structural or societal effects. Using a national census data file for 1980, Poston (1994) conducted by far the largest study of the earnings attainment of male immigrants from 92 countries in the United States. His model included fourteen various human capital characteristics as individual-level independent variables. However, his low average R-square value of 0.28 indicated that exclusively human capital microlevel models of earnings attainment did not provide the final answer to the observed earnings differentials among male immigrants. He suggested that to improve predictive efficiency future research include ecological variables representing the specific opportunity structures and contexts to which immigrant groups have access. He reasoned that immigrants to the United States do not arrive as isolated individuals with only their human endowments. Indeed, Portes and Bach (1985) also held that depending upon their country of birth, immigrants may have access to various kinds of opportunity structures, networking environments, and

other social contacts. Obviously, earnings attainment of individual workers is a function of both their own characteristics and the varied contexts in which they reside. Accordingly, multilevel modeling techniques, which take into account both individual and contextual characteristics, would be the appropriate methodology in empirical research.

Two decades ago, Mason, Wong, and Entwisle (1983-4) observed that multilevel research was rare in sociology, but seemed to be more common in economics. This claim is still true to a large extent today. Although multilevel modeling has been applied to demographic analysis of fertility and contraceptive behavior, it is rare in studies of the economic behavior of immigrants (Poston 2002). Thus, this dissertation will undertake an examination of the effects of both individual and contextual characteristics on the earnings attainment of Chinese workers using data from the 2000 census of the United States.

There are two levels of independent variables. The characteristics of Chinese American workers nested in metropolitan areas will be used as the individual or level-1 independent variables. These include educational attainment, labor market experience, and English language ability. In order not to bias the estimates of the independent variables, control variables will also be introduced into the models. They are gender, marital status, and employment sector.

The Metropolitan Statistical Area (MSA) defined by the Office of Budget Management (Office of Budget Management 2000) will be used as the contextual or level-2 unit of analysis in this dissertation. MSAs, which are proxies of local labor

markets, are assumed not to be homogeneous in labor force characteristics, racial composition, employment structure, economic well-being, and so forth, thus bringing about different economic outcomes for individual workers. There are thus numerous contextual or level-2 factors that may affect the earnings attainment of individuals in various labor markets. Ethnic group characteristics and the local labor market conditions will be studied as the most relevant contextual variables in this dissertation. Ethnic group characteristics include the relative sizes of Chinese American, Asian Americans, and non-whites, respectively, the percent of Chinese-owned businesses (proxy for social capital), occupational and residential segregation from majority whites; unemployment rate is used to measure the economic well being of a local market.

Hierarchical Linear Modeling (HLM) (Bryk and Raudenbush 1992; Raudenbush and Bryk 2002; Raudenbush, Bryk, and Congdon 2005) techniques will be employed to make the most adequate and informative use of the individual and contextual data available and to determine the importance of each variable in shaping the economic outcomes of Chinese workers in the United States.

This study represents an attempt to bring new insights into earnings attainment models and to add to the meager body of knowledge concerning the individual as well as contextual factors that may affect the earnings process of a minority group in the United States. Knowledge of these factors may help formulate policy measures to improve the economic status of not only those under study but also many other racial and ethnic groups.

This dissertation is organized into eight chapters. Following this introductory

chapter, Chapter II presents a socioeconomic profile of Chinese workers in the United States. It begins with a historical overview of the changes of the U.S. Chinese population from 1840s to 2000 and then proceeds to assess their status attainments in terms of education, occupation, and earnings, mainly from 1940s to the present. Chapters III and IV review selected major theoretical perspectives on earnings attainment and their applications in empirical analyses of Chinese workers. Chapter V presents an analytic framework and the research hypotheses. Chapter VI discusses the data, sample selection, measurement of variables, and methodology to be employed in this dissertation. Chapter VII presents the sample descriptive statistics, preliminary information of the data, specification of empirical models, and the HLM regression results. The concluding chapter provides a summary of the findings, discussion of the strengths and limitations of the study, and issues of future research.

CHAPTER II

SOCIOECONOMIC PROFILES OF CHINESE AMERICANS

First of all, the terms "Chinese" or "Chinese Americans" used in this dissertation refer to both those born to Chinese parents in the United States and those immigrants born outside the country and identified themselves as Chinese, be they from Mainland China, Taiwan, Hong Kong, Macao, or other parts of the world. These two terms are used interchangeably.

This chapter begins with a brief historical overview of the socio-demographic changes of Chinese in the United States from 1840s to 2000. The geographic distribution of the Chinese population is also discussed. After that, a review of the socioeconomic status of Chinese Americans in terms of education, occupation, and earnings since the 1940s is presented. Mainly based on the decennial census data, this review intends to provide an important context or background for a better understanding of the earnings attainment of Chinese workers in the United States in the late 20th century.

Chinese Population in the U.S.: A Historical Overview

The Chinese are not only the first group of Asians to enter the United States in sizeable numbers (Chan 1996), but also by far the largest subgroup of Asian Americans since 1990 (U.S. Bureau of the Census 1991, 2001b). Although they were present in the U.S. as early as the 1700s (Wong 1986), their numbers were very small even in the first half of the 19th century. For example, official sources recorded only three Chinese in the

United States in 1830, eight in 1840, and 758 by 1850 (Lee 1960). At the beginning, Chinese came to this country mainly as merchants. It was not until the middle of the 19th century when the Gold Rush in California and the westward expansion of the trans-Mississippi frontier drew significant numbers of immigrants from China to work as cheap labor. By 1860 the U.S. census recorded 34,933 Chinese immigrants in this country, with almost all of them residing in California; the 1870 census counted some 60,000 Chinese, with almost 50,000 of them in California (Lee 1960; Kitano and Daniels 2001).

From 1851 to 1882, a period of open immigration, the discovery of gold and the lure of job opportunities in the U.S. West, coupled with overcrowding, drought, and warfare in China, encouraged more than 300,000 Chinese to take a chance in the United States (Lyman 1974; Schaefer 1979; Marger 1994). Barth (1964) noted that the Chinese newcomers differed significantly from other migrants to the United States in both motivation and experience: they intended to earn money in the country but not to stay there forever. As such, although some men of the merchant class came along with their wives or concubines, the vast majority of Chinese men were laborers who immigrated to the country without their families and were closely attached to their home villages, to which they planned to return eventually. Generally, they worked in gold mining, in agriculture, in various urban occupations, and, as the builders of the first transcontinental railroad (Lyman 1974; Kitano and Daniels 2001). Only a few made their fortune, many others failed; worse, many men continued to remain single because of the lack of Chinese women in the United States. Consequently, two thirds of the original migrants

apparently returned to their homeland, as there were never more than 110,000 Chinese in the United States at any one time before the Chinese Exclusion Act was repealed in 1940s (See Table 1). The early returns made their voyages to America sojourner visits rather than permanent commitments, thus leaving them incapable of involving themselves in the mainstream society (Weiss 1974; Lyman 1974; Coolidge 1909; Ling 1993).

Table 1. Chinese Population in the United States by Sex and Sex Ratio, 1830-2000

Year	Total	% Change	Male	% Change	Female	% Change	Sex Ratio
1830	3	--	--	--	--	--	--
1840	8	--	--	--	--	--	--
1850	758	--	--	--	--	--	--
1860	34,933	--	33,149	--	1,784	--	1,858.1
1870	63,199	80.9	58,633	76.9	4,566	155.9	1,284.1
1880	105,465	66.9	100,686	71.7	4,779	4.7	2,106.8
1890	107,488	1.9	103,620	2.9	3,868	–19.1	2,678.9
1900	89,863	–16.4	85,341	–17.6	4,522	16.9	1,887.2
1910	71,531	–20.4	66,856	–21.7	4,675	3.4	1,430.1
1920	61,639	–13.8	53,891	–19.4	7,748	65.7	695.5
1930	74,954	21.6	59,802	11.0	15,152	95.6	394.7
1940	77,504	3.4	57,389	–4.0	20,115	32.8	285.3
1950	117,629	51.8	77,008	34.2	40,621	101.9	189.6
1960	237,292	101.7	135,549	76.0	101,743	150.5	133.2
1970	431,583	81.9	226,733	67.3	204,850	101.3	110.7
1980	812,178	88.2	410,936	81.2	401,242	95.9	102.4
1990	1,645,472	102.6	821,124	99.8	824,348	105.4	99.6
2000	2,422,970	47.3	1,167,065	42.1	1,255,905	52.4	92.9

Sources:
Adapted from Chow (1996:113), Table 1.
Data for 1830-1850 are from Lee (1960:21).
U.S. Bureau of the Census. 1960. Historical Statistics of the United States: Colonial Times to 1957.
U.S. Bureau of the Census. Population Reports, 1963, 1973, 1983, 1991, and 1992.
U.S. Bureau of the Census. Census 2000 Summary File 4 (SF 4), Table PCT3, retrieved from: http://www.census.gov.

Compared to men, Chinese women had fewer opportunities for moving out of their homeland because Chinese social customs did not allow them. Consequently, only small numbers of Chinese women managed to migrate to the United States in the 19th century. Official statistics show that there were only 1,784 Chinese women in America in 1860. Given a 156 percent increase from the previous decade, they accounted for only a small fraction of the U.S. Chinese population in 1870 (See Table 1). They were mainly distributed throughout California, Nevada, and Idaho. Most worked as indentured servants, unskilled laborers, slaves and prostitutes in mining areas; some were the working wives of farmers, grocers, restaurant owners, laundrymen, cooks, and laborers (Chow 1996).

At the beginning of their arrival, the Chinese were welcomed by Americans as cheap and hard-working laborers. However, an anti-Chinese movement began to mount in the United States for various reasons. Coolidge (1909) attributed a strident xenophobia against the Chinese to some special circumstances in Californian communities: the high influx of settlers from the South, the absence of a core of settled citizens and any real social structure, over-settlement, and the exhaustion of alluvial gold deposits. Some observers hold that Chinese were later excluded just because they turned out to be "inassimilable" aliens (Weiss 1974); others believe that they were excluded because they were "accepting" a lower standard of living, which, together with continued large-scale immigration, diluted the income of the white miners (Boswell 1986). Schaefer (1979) suggested that the life style of Chinese immigrants as sojourners,

the allegations of coolie labor, and racism were the three major reasons for the anti-Chinese movement in the United States.

As a result of several decades of anti-Chinese agitation, inspired by real or imagined reasons, the U.S. Congress passed the Chinese Exclusion Act in 1882, intending to halt Chinese immigration for a ten-year period. This was the first piece of legislation that targeted a specific ethnic or racial group for exclusion (Nee and Nee 1986).

The Chinese Exclusion Act of 1882 was only one example of discriminatory legislation. Many other laws were designed to make it difficult or more costly for Chinese to enter certain occupations, like domestic service and laundry work, or to run businesses, such as restaurants and small stores catering to other Chinese ethnics. For instance, during the later part of the 19th century and early 20th century, California and other western states in which the Chinese were concentrated imposed head taxes on Chinese and prohibited them from carrying on certain types of business. Being denied the right by the Act to become naturalized citizens, the Chinese were categorically excluded from political participation and entrance into occupations and professions requiring citizenship for licensing (Glenn 1983). As a result of the restrictive laws, the Chinese were driven out of smaller towns, rural areas, and mining camps during the late 19th century and were forced to congregate in ethnic ghettos (Chinatowns) and to concentrate in a narrow range of industries such as laundries, restaurants, and tourist-oriented enterprises (Yuan 1963; Lyman 1974; Light and Wong 1975), which simultaneously reinforced and exploited their foreignness.

Barth (1964) found that the Chinese remained the only group to be barred from entering the United States for a considerable period. As shown in Table 1, the early Chinese population in the United States grew until 1890, when the census reported their total number as slightly more than 107,000. There were fewer Chinese in 1900 than in the previous decade. By 1910, the Chinese population dropped to around 70,000, a figure that did not change much until 1950. This decline was the result not only of the restrictive legislation itself but also of the overwhelming shortage of females, return migration, and the deaths of the aged (Lyman 1974).

Also, because of the Chinese Exclusion Act of 1882, the Chinese female population in the United States never had a chance to exceed 5,000 from 1890 to 1910 (See Table 1). The sex ratio reached a historical high in 1890 when there were 2,679 men for every 100 women. The ratio did not drop below 200 till 1950 when the U.S. policy promoted family unity (Lee 1960). Because restrictive legislation and discriminatory practices greatly reduced employment opportunities for Chinese workers in the general labor market, the Chinese established a family-based economy that targeted a limited ethnic market for household consumption. Most women labored together with their men, doing sewing and needlework, cooking, washing, rolling cigars, cleaning, and making slippers and brooms while caring for their children and families (Chow 1996).

It was not until 1943 that the Chinese Exclusion Act was repealed, in part because China was a wartime ally of the United States during World War II (Wong 1986). Also, with the entry of war brides, refugees, and some scientific personnel after

WWII, the Chinese population experienced over 50 percent and 100 percent increases in 1950 and 1960, respectively (See Table 1).

In 1965, the national quota system was abolished and immigration legislation was revised. As a direct result of the liberalization, large numbers of Chinese from Hong Kong and Taiwan were admitted to the United States. Added to the Chinese population were a large number of Vietnamese refugees who were ethnically Chinese (Marger 1994). All of these streams render the Chinese as one of the fastest-growing minority groups in the United States. In total numerical increase, Chinese Americans outgrew the other Asian Pacific American (APA) groups, and more significantly, they made up the third largest group of legal immigrants to the United States in the 1980s, exceeded only by those from Mexico and the Philippines (Tong 2003). In 1990, Chinese Americans constituted the largest APA population; they represented 22.6 percent of all APAs and about 0.7 percent of the total population in the United States. Foreign-born persons accounted for 69.8 percent of the Chinese population in the United States in 1990 (U.S. Bureau of the Census 1991).

The repeal of restrictive immigration policies in the 1960s led to a dramatic increase in the population of Chinese American women: their numbers experienced a nearly four-fold increase from 101,743 in 1960 to 401,242 in 1980, and then more than doubled from 1980 to 824,348 in 1990. In sharp contrast to the extremely high sex ratios before 1910 when they were well over 1,000, the ratio was roughly balanced (102.4) in 1980, then began to drop below 100 in 1990 (See Table 1). That is to say, Chinese women began to outnumber Chinese men in the United States in 1990.

The increase in the population of Chinese American women was accompanied by an increase in their labor force participation. With the rise of the population since the 1960s, the extent and nature of Chinese American women's involvement in the economic activities also changed phenomenally. The labor force participation rate for Chinese American women jumped from 30.8 in 1950 to 44.2 percent in 1960 and to 59.2 percent by 1990, surpassing that of White women and all U.S. women (U.S. Bureau of the Census 1953, 1963, 1993). The 1990 census also shows that by 1990, 38 percent of Chinese women were employed in technical, sales administrative, and clerical jobs, while 17 percent were in professional jobs and 15 percent were employed in managerial positions. In the Chinese family, although men still reign as the major bread-earners, women's participation in family economic activities or wage-earning work is essential and indispensable for the survival of their families in the United States (Ling 1998).

In the 2000 census, Chinese Americans remain the largest Asian group, with 2,422,970 reporting being Chinese alone, or 23.7 percent of a total of 10,232,998 Asian populations who reported being one Asian group alone (U.S. Bureau of the Census 2001b). This number increases to about 2.7 million if those who reported their race/ethnicity as a combination of Chinese and one or more other races/ethnicities are included. Between 1990 and 2000, the total population of those who reported being Chinese alone increased by over 787,000. Chinese Americans made up 0.9 percent of the total U.S. population in 2000 (Tong 2003). And again, Census 2000 attests to the big role played by immigration: An estimated 1.5 million of the over 2.4 million Chinese are foreign-born, accounting for 62.5% of Chinese Americans nationwide (U.S. Bureau of

the Census 2001b). With a sex ratio of about 93, Chinese women continue to outnumber Chinese men in the United States in 2000 (See Table 1).

The pattern of Chinese settlement provides some clues for the understanding of their socioeconomic achievement. Historically, the majority of Chinese Americans have tended to reside in just a few states such as California and New York; this pattern of residence remained much the same in the 1990s (Frey and Farley 1996) and continued towards the end of the 20th century. For example, in 1960, nearly three fourths of Chinese resided in three states--California (40%), Hawaii (16%), and New York (16%) (Yuan 1969). The 1980 and 1990 censuses continue to show that California (40.1%, 42.8%), New York (18.1%, 17.3%), and Hawaii (6.9%, 4.2%) are the states with the largest concentrations of Chinese (Barringer, Gardner, and Levin 1993). The 2000 census shows that California, New York, and Texas, in descending order, are the three states with the largest numbers of Chinese Americans (U.S. Bureau of Census 2001b).

Within a state or city, Chinese again have tended to be heavily congregated in or close to Chinatowns (Jiobu 1976). According to Lee (1960), from 1850 to 1880, Chinese were concentrated in California where the first and oldest Chinatown provided not only ethnic goods and services but also mutual aid and protection that were not available elsewhere. From 1880 to 1910, Chinese residents began to move out of California and settled in metropolises like New York, Boston, Chicago, and Baltimore. And from 1910 to 1950, the Chinese population moved toward greater concentrations in cities with over half a million inhabitants, such as Brooklyn, Chicago, Detroit, Los Angeles, and New York. The trend was evidenced by these statistics: by 1940, 71 percent of the Chinese

population was in large cities, 20 percent in smaller cities and 9 percent in rural area; by 1950, 94 percent of the population was in cities of various sizes and only 1 percent in rural areas (Lee 1960). The censuses of 1990 and 2000 show that Chinese population tends to concentrate in metropolitan areas such as San Francisco, Los Angeles, New York City, and Houston, among others (U.S. Bureau of the Census 1991, 2001b).

Early on, most of the Chinese in the United States came from Taiwan and Hong Kong. However, more exchanges and migrants are streaming from the People's Republic of China since the country began to open to the outside world in the late 1970s. Most new arrivals have chosen to reside in cities because entry-level jobs are far more accessible. Moreover, Chinese immigrants tend to converge in cities to take advantage of the social and economic support of their ethnic community. For example, Tong (2003) found that the Taiwanese influx, which includes a significant number of highly skilled and professional workers, has chosen to reside in Los Angels and outlying areas because of opportunities in high technology and the region's Asia-Pacific business environment. Many of the newcomers from Mainland China and Hong Kong are of middle and working class backgrounds with little education, job experience, and English proficiency, and would be likely to end up concentrating in New York or San Francisco to take advantage of a burgeoning ethnic economy—knitted by kinship networks—that offers jobs and small-business opportunities.

Having reviewed the socio-demographic changes of Chinese in the United States from 1840s to 2000, the following sections proceed to present their socio-economic profiles. However, as indicated in the review above, the demographic characteristics of

the Chinese Americans did not achieve normalcy till after 1940 (Lee 1960). Also, previously there had been no meaningful data for some categories for making similar comparisons. As such, the following review of the socioeconomic status of Chinese Americans in terms of education, occupation, and earnings is based primarily on the decennial data since the 1940s.

Educational Achievement

Traditionally, Chinese have held education in high esteem and viewed it as an important pathway to upward mobility. Accordingly, parents would try their best to support the education of their children and the latter were always motivated to move upwards via schooling. However, the educational attainment of Chinese in the United States was well below the norm in 1940. For example, the census reported that only 2.8 percent of Chinese males aged 25 and over had completed four or more years of college (See Table 2). The corresponding percentage for their white counterparts was 5.8 percent. Chinese males who had not gone beyond grade school levels ranked second only to black males in percentage (78.2% vs. 84.6%).

Although the percentage of college-educated Chinese women (3.7%) was relatively higher than that of Chinese men (2.8%) and was close to that of white women (4.0%) in 1940, their proportion of less than 8th grade (71.2%) was 16 percentage points higher than that of white women (54.8%) and second only to that of black women (80.6%). Also, both Chinese men and women compared unfavorably with their Japanese American counterparts at all levels except that Chinese women led Japanese women by

Table 2. Educational Levels of Selected Racial/Ethnic Groups Aged 25 and Over, 1940-2000

Years of Education Completed	Chinese		Japanese		White		Black		Hispanic	
	M	F	M	F	M	F	M	F	M	F
1940										
0-8	78.2	71.2	52.4	56.0	59.7	54.8	84.6	80.6	--	--
9-11	7.7	8.2	12.1	11.2	14.9	16.3	7.1	9.8	--	--
12	5.7	11.7	21.9	25.0	12.9	17.3	3.4	4.8	--	--
13-15	1.9	2.8	5.1	3.4	5.2	6.5	1.5	2.1	--	--
16+	2.8	3.7	6.4	2.8	5.8	4.0	1.3	1.2	--	--
Missing	3.6	2.5	2.2	1.6	1.5	1.2	2.0	1.5	--	--
1950										
0-8	57.5	50.2	29.7	30.2	41.4	42.6	73.0	68.8	--	--
9-11	9.2	8.3	11.4	9.9	16.9	17.8	11.6	14.5	--	--
12	10.6	20.6	35.8	43.1	18.7	24.1	6.8	8.6	--	--
13-15	5.3	7.1	10.0	8.2	7.2	7.9	2.6	3.0	--	--
16+	8.8	9.5	8.9	5.4	7.6	5.3	1.9	2.2	--	--
Missing	8.7	4.4	4.1	3.2	3.0	2.3	4.2	2.9	--	--
1960										
0-8	46.6	42.4	26.9	29.6	39.5	35.7	64.5	57.7	--	--
9-11	10.9	10.1	14.3	13.6	18.9	19.6	17.3	20.5	--	--
12	15.5	24.3	34.6	41.4	22.2	29.2	11.3	14.3	--	--
13-15	8.8	9.4	10.4	9.1	9.1	9.5	4.1	4.1	--	--
16+	18.2	13.9	13.9	6.3	10.3	6.0	2.8	3.3	--	--
1970										
0-8	29.0	36.5	17.9	19.8	27.8	25.6	47.0	41.1	44.6	47.9
9-11	10.7	8.7	11.2	13.0	18.2	19.4	22.9	26.4	17.5	18.0
12	18.8	23.8	34.8	42.7	28.5	35.5	20.0	22.2	20.9	23.1
13-15	10.6	11.4	13.9	13.3	11.1	11.1	6.0	5.8	9.2	6.7
16+	30.8	19.6	22.3	11.1	14.4	8.4	4.2	4.6	7.8	4.3
1980										
0-8	17.4	35.2	8.6	11.7	16.9	16.4	28.8	25.6	39.1	41.3
9-11	7.4	7.4	7.2	8.8	13.6	15.5	20.5	22.9	15.5	16.1
12	17.2	22.0	30.0	40.1	31.8	39.1	28.3	30.0	22.6	26.0
13-15	14.2	15.8	19.1	19.8	16.4	15.6	14.0	13.2	13.4	10.6
16+	43.8	19.5	35.2	19.7	21.3	13.3	8.4	8.3	9.4	6.0

Table 2. (*Continued*).

Years of Education Completed	Chinese M	Chinese F	Japanese M	Japanese F	White M	White F	Black M	Black F	Hispanic M	Hispanic F
1990										
0-8	13.5	19.9	4.1	6.7	8.0	8.1	14.5	13.2	30.4	30.9
9-11	9.3	9.9	6.0	7.7	12.4	13.4	23.3	23.0	19.8	19.2
12	12.8	16.2	21.5	29.5	28.6	33.9	28.3	27.7	20.6	22.5
13-15	17.6	19.0	25.8	27.9	25.5	25.8	23.0	24.4	19.2	19.0
16+	46.7	35.0	42.6	28.2	25.6	18.8	11.0	11.7	10.0	8.3
2000										
0-8	11.9	16.1	2.5	4.4	4.6	4.6	8.1	7.5	28.3	27.2
9-11	8.9	8.8	4.5	5.9	9.9	10.0	20.8	19.0	20.8	18.7
12	11.9	14.3	18.6	24.9	28.5	31.4	31.4	28.5	21.8	22.4
13-15	14.6	16.8	25.0	28.6	27.6	29.3	26.5	29.8	18.8	20.9
16+	52.6	44.0	49.4	36.3	29.3	24.8	13.1	15.2	10.2	10.7

Source: U.S. Bureau of the Census.
1943. Sixteenth Census of the United States, "Characteristics of the Non-white Population by Race: 1940", Table 6.
1953. Seventeenth Census of the United States, "Non-white Population by Race: 1950", Tables 9, 11, 12; "Nativity and Parentage", Table 9.
1963. Subject Reports, PC(1)-1-1C, Table 76;
1973. Subject Reports, PC(2)-1C, Tables 19, 21, 22, 23; PC(2)-5B;
1983. 1980 Census of Population, PC80-1-2E.
1993. 1990 Census of Population, 1990CP-2-1, Table 106;
2001c. 2000 Summary File 4 (SF 4), PCT64: "Sex by Educational Attainment for the Population 25 Years and Over." Retrieved from http://www.census.gov.
Note:
1) --: Data not available.
2) For 2000 data, single race/ethnicity is used for calculation and comparison.

about 1 percentage point in college education in the same year. It is worthwhile to note that although compared unfavorably with their white counterparts at all levels of educational attainment, Chinese did better than blacks overall--a possible result of the Gentlemen's Agreement of 1907-1908. Although it was intended to prevent Japanese

ethnics from discriminatory practices in the U.S. schools, the agreement might also have benefited Chinese ethnics because of their similar appearance to the Japanese.

In spite of this, it was not until 1950 that the educational achievement of Chinese Americans was at about the level of the general U.S. population: median years of schooling completed were 8.4 for Chinese men and 10.3 for the younger and more predominantly native-born Chinese women (Lee 1960; Kitano and Daniels 2001), and 8.8 percent of Chinese men, compared to 7.6 percent of white men had completed four or more years of schooling; 9.5 percent of Chinese females were in this category, compared to 5.3 percent of white females (See Table 2).

As indicated previously, Chinese population in the United States has experienced dramatic growth since 1960s. Accompanying the rapid increase is their extraordinary high educational achievement. For example, Wong (1980) found that Chinese males aged 25 and over had 9.2 median years of schooling completed with white males having 10.7 in 1960; in 1970, both foreign-born and native-born Chinese males had equaled or surpassed white males when measured by median years of schooling completed, percentage with four years of high school or more, and percentage with four or more years of college.

As shown in Table 2, Chinese females compared favorably with their white counterparts only in “college education and above” in both 1960 and 1970: higher percentages of Chinese females than their white counterparts have earned a bachelor degree or above; they have about the same percentages in the “13-15” category (9.4 vs. 9.5 for 1960 and 11.4 vs. 11.1 for 1970). However, like Chinese men, Chinese women

at the other end of the educational spectrum had a conspicuously high percentage with no education or less than 8th grade in the two decades: 42.4 percent in 1960 and 36.5 in 1970. This bimodality of educational attainment is intuitively obvious among the Chinese and much more serious than for white females (35.7% in 1960 and 25.6% in 1970).

The 1980 census data show that both Chinese and whites experienced large increases over their 1970 figures in the percentage of population with four or more years of college education (See Table 2). And the increases for Chinese were more drastic than for other groups. Table 2 also shows that 43.8 percent of Chinese men as compared to 21.3 percent of white men completed four or more years of college in 1980; the numbers for Chinese women and white women are 19.5 percent and 13.3 percent, respectively. Moreover, the rapid increase in college education was accompanied by a rapid drop in the proportions of those with less than 8th grade. These statistics show that Chinese Americans indeed have a higher level of educational attainment than other groups. This phenomenal achievement in education may be attributed in part to the sizable influx of highly educated professionals of Chinese origin admitted into the country in accordance with the immigration policy that emphasizes occupational preference. Typically they had completed education before they migrated, and this may have inflated the proportion of college-educated Chinese to some extent. This is obvious when compared to the increases in education from 1960 to 1980 for whites and blacks who had low levels of immigration. Their percentages of college graduates closely reflect the amount of their respective upward achievements over the decades.

Chinese Americans continue to advance in educational achievement in 1990. Chinese men and women compare favorably at most levels with their respective white counterparts. In 2000, for the first time in history, over half (52.6%) of Chinese males 25 years and older completed at least college education; the percentage for Chinese females (44.0%) is also a record high. This increase can be attributed to the higher attainments of the native-born Chinese over the decades, and in part to the passage of the Chinese Student Protection Act in 1992, which allowed 48,212 students from Mainland China where were already present in the United States to become permanent residents (Ueda 1994). The proportions with less than 8th grade for Chinese males (11.9%) and females (16.1%) are also the lowest of all time, though they are still higher than their respective black counterparts (8.1% vs. 7.5%).

In summary, Table 2 shows an obvious trend of Chinese achievement in education. It began in 1940 with an upright pyramid characterized by a few high degree earners at the top and an overwhelming majority with no or minimum education at the bottom. By 2000, it changed to an upside down pyramid with more college degree holders and above at the top and very few less than 8th graders at the base. In spite of this outstanding achievement by 2000, Chinese men and women still compared unfavorably with whites and even blacks in the less than 8th grade category.

The phenomenal educational level of Chinese Americans achieved in the past decades has glorified them as a “model minority”. A number of theories have been proposed to explain their high educational achievement. From a cultural view, some argue that Confucianism accounts for the educational success of Chinese in the United

States because it relates education to one's status attainment and has been held in high esteem for thousands of years (Barringer et al 1993; Xie and Goyette 2003). Indeed, historically, education has served to facilitate upward mobility for those from poor family origins in pre-modern China (Ho 1962). This traditional ideology and practice are carried over to wherever Chinese migrated and their descendants are always pushed to higher education because "there is much respect for the scholar" in Chinese culture (Wong 1980:517).

Emphasizing the impact of structural forces, relative functionalism asserts that limited opportunities in areas outside education have forced Chinese Americans to pay more attention to education as an avenue for upward social mobility. In a similar argument, accommodation theory suggests that immigrants avoid constant direct confrontation with the majority and continually adapt to given sets of social and economic conditions through their own initiatives and at their own pace (Endo 1980). Educational attainment serves as a key element in the accommodation strategy for immigrants: parents constantly push their children to strive for a better education as a means of improving their situation. This explains the fact that a larger number of Chinese and Japanese go to college and that these groups present high aggregate levels of education in the host country. In a similar vein, Xie and Goyette (2003) argue that when facing the possibility of discrimination and lacking necessary political resources and social capital, Asian Americans tend to choose paths with few barriers in order to achieve high status. Higher education is one of the channels through which upward

mobility is achieved in the market economy where fair competition is at least held as a norm and objective criteria predominate.

Occupational Distribution

According to Wong (1980), Chinese in the United States have undergone three main periods of wide-scale occupational adjustments since the 1850s. When they first arrived in the U.S., Chinese worked in large numbers in the mines and on the railroads in the western states. Later, they turned to the agricultural sector as their main source of occupation (Tsai 1986; King and Locke 1980). In the second period which was characterized by restrictive laws and overt discrimination, they were confined to ethnic ghettos (Chinatowns) where they created occupations intended to serve their own ethnic community or specialized in occupations avoided by or seen as noncompetitive with whites, such as laundry and restaurant workers, both known as occupational stereotypes for the Chinese (Yuan 1969). Finally, when China became a U.S. ally during World War II, the war economy began to provide opportunities for Chinese individuals to participate in the job market in the larger society. This section is mainly about the occupational distribution of Chinese in the United States since World War II.

Table 3 presents the distribution of major occupational groups among employed Chinese men and women from 1940 to 2000. In 1940 and 1950, apart from the low-paying occupations such as “Service” and “Laborer/Operator”, Chinese males aged 14 and over were also found to cluster in the “Managers/Official” category: at least one out of five Chinese males were managers or administration officials. However, when

Table 3. Percentage Distribution of Major Occupations of Employed Chinese Americans by Sex, 1940-2000

	1940		1950		1960		1970		1980		1990		2000	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Total Employed	34,081	2,911	40,131	8,278	71,435	27,349	113,929	67,261	225,100	174,864	446,767	373,165	619,464	555,213
Managers/Officials	21.3	8.7	22.2	7.9	15.5	5.4	11.6	4.3	15.0	10.4	15.3	14.9	17.0	17.5
Professional/Technical	2.4	7.4	6.3	11.0	18.4	16.8	30.2	20.2	30.3	20.4	31.4	23.4	38.2	31.5
Clerical/Sales	10.0	25.8	11.2	38.8	13.7	38.1	12.7	35.6	15.6	34.3	17.7	31.8	15.8	26.3
Laborer/Operator	25.0	26.9	21.7	21.7	21.2	22.5	21.2	24.9	22.2	13.8	18.9	13.6	14.0	11.9
Service	36.6	29.2	34.3	17.6	23.6	10.2	23.7	14.6	16.3	20.8	16.2	16.2	15.0	12.7
Farm/Fishing/Forestry	4.1	0.8	3.0	0.8	1.2	0.7	0.6	0.4	0.6	0.3	0.5	0.2	0.1	0.1
Not Reported	0.6	1.3	1.3	2.1	6.6	6.3								

Source: U.S. Bureau of the Census.
1943. Sixteenth Census of the United States, 1943, "Characteristics of the Nonwhite Population by Race: 1940", Table 7;
1953. Seventeenth Census of the United States, 1953, "Nonwhite Population by Race: 1950";
1963. Subject Reports, PC(2)-1C, "Nonwhite Population by Race", Table 35;
1973. Subject Reports, PC(2)-7A, Table 39.
1983. Census of Population, PC80-1-2E, Table 21.
1989. Subject Reports, PC(1)-1C, PC(2)-1C.
1993. 1990 Census of Population, 1990CP-2-1, Table 110.
2001c. 2000 Summary File (SF 4), PCT86, retrieved from http://www.census.gov
Note: 1940-1960 censuses reported employed persons aged 14 and over, 1970-2000 censuses reported employed persons 16 years and over.

interpreting their high representation in these high-profile occupations, some researchers (e.g., Endo 1980; Duleep and Sanders 1992) remind us that some census categories are misleading. In reality, most of the Chinese classified as managers are owners of small ethnic businesses concentrated in ethnically or racially homogeneous enclaves, operating on a scale and in a manner quite different from large employers in mainstream sectors of the economy (Woo 1994). Since the category "Executive, management, and administrative position" includes a diversity of occupational positions, ranging from high corporate positions to managers of small mom-and-pop stores, it is impossible to easily ascertain a group's relative representation in high-ranking managerial positions.

Compared with the high representation in "Managers/Official" occupations, the proportions of Chinese men and women in the "Professional/Technical" category were very low in both 1940 and 1950. However, as shown in Table 3, the professionalization of Chinese Americans did show an increase since 1940. For example, the "Professional/Technical" category had nearly a 4.0 percentage-point increase for Chinese males from 2.4 percent in 1940 to 6.3 percent in 1950 and more than a 3.0 percentage-point increment for females from 7.4 percent in 1940 to 11.0 percent in 1950.

In 1960, a substantial increase in Chinese males' representation (18.4%) in professional and technical occupations was accompanied by a drop in "Service" and "Managers/Official" occupations from 1950. Chinese women also experienced similar changes in the same period, though in a smaller magnitude. In this period, Chinese men were more likely to be employed in service (23.6%) and labor/operation work (21.2%);

Chinese women tended to concentrate in "Clerical/Sales" (38.1%) and "Laborer/Operator" work (22.5%).

Three decades ago, Yuan, Nelsen, and Rutzen (1969, unpublished paper, citied in Lyman 1974:137) predicted that the professionalization of Chinese in the United States would probably continue for the rest of the 20th century, but that the ratio of Chinese in managerial and proprietorial positions would remain stable or decrease as Chinese merchant enterprises declined in proportion to the increase in professional careers. This is basically what has happened since 1970. Chinese males and females employed in professional and technical occupations continued to increment in numbers through 1970. Specifically, the largest proportion of Chinese males (30.2%) was employed in the professional category in 1970 and remained stable until 2000; Chinese females in that category also increased from 16.8 percent in 1960 to 20.2 percent in 1970 and remained stable for the rest of the 20th century. As for the "Managers/Official" category, Chinese men and women experienced continued decreases from 1940 to a record low in 1970, then bounced back in 1980 and remained relatively stable for the rest of the century. It is worthwhile to note that the increases in professional and technical occupations may in part be the result of the 1965 Immigration Act which explicitly encourages and selects highly educated and professionally trained immigrant workers for admissions (Keely 1971), and thus forms a significant departure from the previous pattern.

Among Chinese men, the decline in "Service" occupations was accompanied by ups and downs in "Laborer/Operator" and "Clerical/Sales" work between 1970 and 2000. Chinese women experienced a long-term downward trend in "Clerical/Sales" and

"Laborer/Operator" occupations in the same period.

Table 3 also shows that Chinese men and women are least likely to be employed in "Farm/Fishing/Forestry" occupations. Over the past six decades, their already low representations in this category continued to decline and became almost negligible in 1999. This is because Chinese are highly urbanized and tend to concentrate in metropolitan areas.

In summary, the occupational status of the Chinese in America began to improve in distinctive and measurable proportions after 1940. A highly visible portion of the Chinese entered selected areas of the professional world. As indicated in Figure 1, the occupational pattern of Chinese males from 1940 to 2000 shows two grand trends: one is a continued concentration in professional and technical areas while the other features a continuing convergence of managerial and administrative, clerical sales, and service occupations from 1980 onward. Chinese men's representation in manual labor occupations also shows a declining trend and falls below the level of other non-farm occupations in 2000. As shown in Figure 2, for Chinese females, their increasing representations in "Professional/Technical" and "Managerial/Official" jobs (from 1970 onward) have been accompanied by decreasing participation in clerical, labor, and service categories in recent decades.

As represented in the two figures, probably the most impressive occupational achievement of Chinese is their spectacular rise in professional and technical occupations since 1940. The reasons behind this success include: 1) the general decrease in restrictive legislation and discriminatory practices against nonwhites in the labor

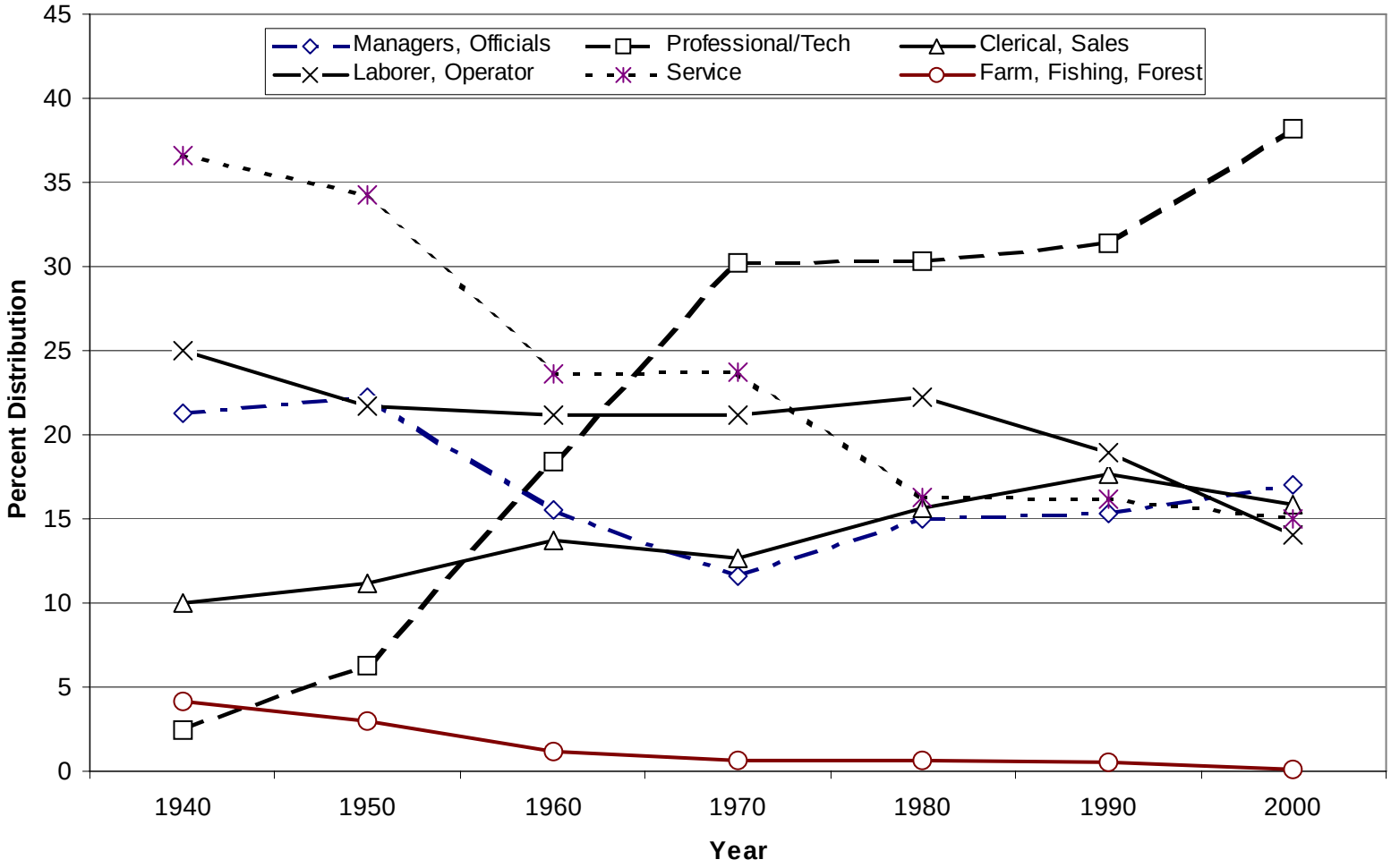

Figure 1. Major Occupational Distribution of Chinese Males in the United States, 1940-2000

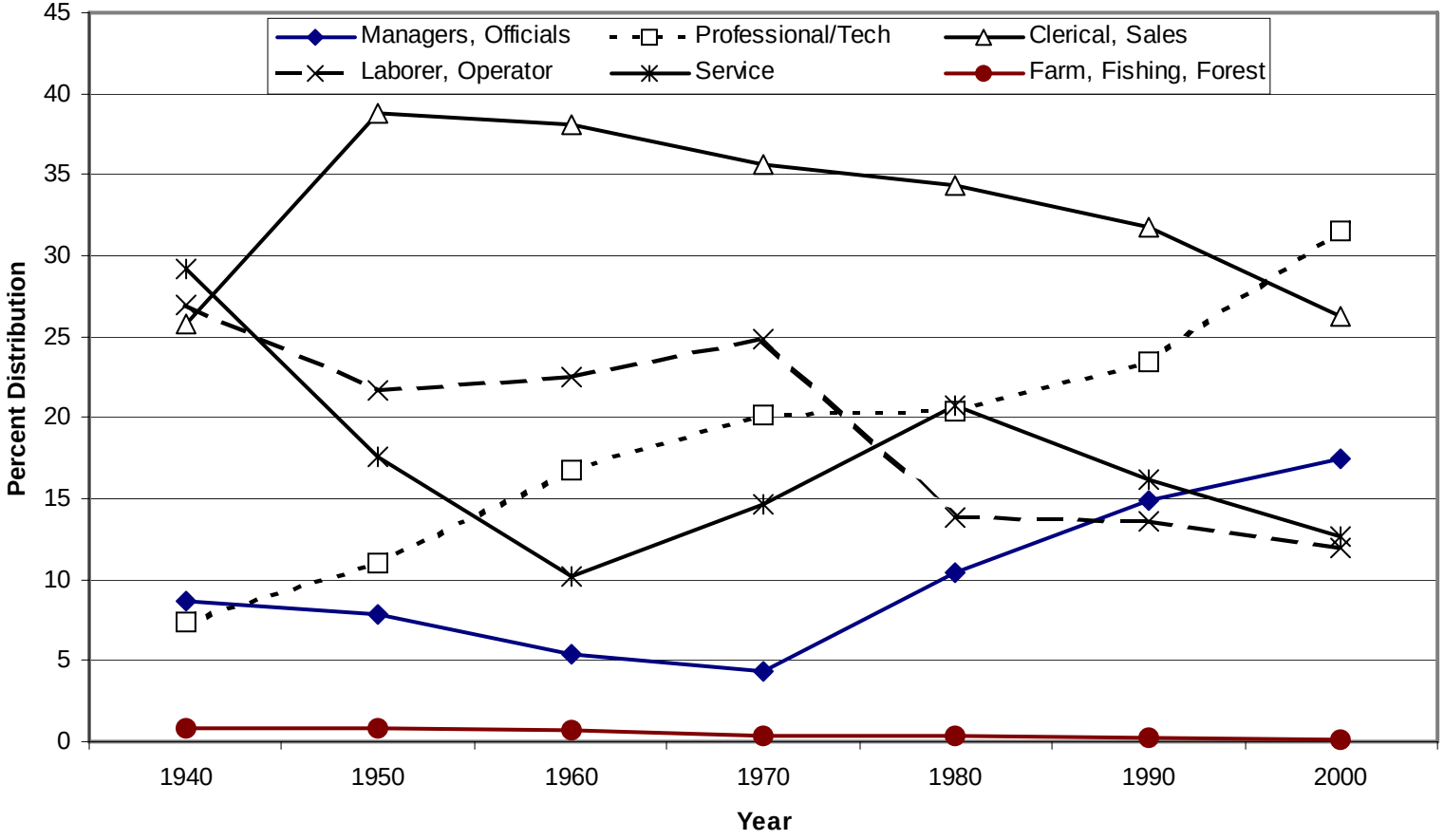

Figure 2. Major Occupational Distribution of Chinese Females in the United States, 1940-2000

market (King and Locke 1980); 2) Chinese have traditionally placed high values on education; a significantly large, well-educated and English-speaking generation of Chinese born in America reached maturity and discovered new opportunities in the war and postwar periods (Lyman 1974; King and Locke 1980; Wong 1980; Hirschman and Wong 1984); 3) the China regime's change in 1949 prompted many Chinese students who had completed their higher education to stay in this country (King and Locke 1980); 4) the easing of admission of Chinese, among whom were a substantial number of highly educated persons; and 5) because almost all licensed or certified professions require U.S. citizenship, the citizenship granted to Chinese beginning in 1943 and the eligibility for naturalization gave them the right to participate in all those professional and commercial activities denied to them before (Lyman 1974). All these elements are indispensable for the socioeconomic advancement of Chinese individuals in the United States.

However, from a different perspective, the entry of Chinese professionals into restricted specialties may be viewed as a new form of occupational accommodation among intellectuals of this minority. On the one hand, the dramatic decline of Chinese in industry such as laundry could be a response to technological changes in this industry and the nearly vanished demand for hand laundry; on the other hand, as an accommodation strategy Chinese are more likely than whites to expect to enter college and to major in science and engineering where universalism is an accepted norm (Xie and Goyette 2003). That is, what matters in these fields is one's performance rather than one's personal characteristics such as race, religion, and social origins that are functionally irrelevant. Therefore, it is possible that Chinese Americans might be

attracted to or pushed toward such professional and technical occupations in order to avoid potential discrimination and to overcome other disadvantages faced as members of a minority group in the labor market.

Language, too, may play an important role in choosing a career among Chinese, particularly the recent immigrants. In explaining their career patterns in 1960, Lyman (1974) suggested that the Chinese took two important factors into consideration when picking their career: English and the social and racial composition of its clientele. That is, the occupations should not tax them in their relatively poor language ability. As such, the professional and technical fields such as engineering, architecture, and independent health professions that emphasize tactile or arithmetic skills appear far more attractive to them than other professional positions such as education and law that require written and oral fluency in English language. The former fields offer not only occupational independence and prestige, but also a chance for relative isolation from professional peers and some freedom of choice in clientele. A detailed study of the San Francisco-Oakland metropolitan area partly confirms Lyman's "rules": Chinese professionals were clustered in accounting, dentistry, nursing, health technology, and engineering but were underrepresented in law, teaching, administration, social services, and the higher levels of the medical professions (Chan 1991).

Earnings Attainment

The above review indicates that Chinese Americans have come to excel in terms of education and occupational attainments in recent decades. However, the ultimate

benchmark for labor market success is how well one can convert these attainments into earnings. This is because earnings attainment measured in dollar amount is an objective indicator and thus less subject to interpretation than occupational prestige or other measures (Barringer et al 1993).

However, studies on the earnings attainment of Chinese Americans and other Asian groups do not always come to the same conclusion: some report continual improvement since the 1960s while others show less success, as Chan (1991) observed. Specifically, the conclusions vary depending on whether studies use median family income or per capita income, whether they use statistics for the nation or for states or metropolitan areas overrepresented with Chinese, whether they distinguish between native-born and immigrants, and whether they separate males from females, among others. Varied findings are presented below.

Using 1960 census data, Schmid and Nobbe (1965) found that although Chinese American men outranked whites in college education and white-collar occupations, their median income ($3,239) was only 74.7 percent that of white men ($4,338); Chinese women compared favorably with their white counterparts: they earned a median income ($2,067) 37 percent higher than that of white women ($1,509).

Chan's (1991) analysis of the 1970 census data showed that Chinese Americans had a median family income $1,000 higher than that of whites. However, she also noted that the U.S. government's study failed to mention the fact that more than one person worked in 60 percent of Chinese families (compared to only in 51 percent of the U.S. population as a whole), which helped to account for their higher family income. She

reasoned that if per capita income, rather than family income, had been used as the measure, then Chinese Americans would be seen as making considerably less than the national average. Moreover, she argued, if Hispanic groups, which were not separated out from the aggregate white figure, had been partitioned from the total white population, then Chinese Americans would not have outranked whites. Other factors, such as the under-enumeration of Asian Americans in low-income areas may also produce incorrectly high socioeconomic data. For example, Endo (1980) found that the under-enumeration, as much as 25 percent in some areas, occurs because of language problems, suspicions or misunderstanding about the census forms and interviews (particularly among older undocumented immigrants and their children), and the difficulty of locating ghetto residents crowded illegally into rooms and buildings without addresses. As a result of this under-enumeration problem, the income statistics of related groups tend to be inflated.

Table 4 compares median family income and median per capita income among selected racial and ethnic groups from 1980 to 2000. The census statistics are consistent with Chan's (1991) findings about the 1970 census data: median family income of Chinese is not only higher than the national level but also outranks that of whites. Moreover, the gap between Chinese and white is increasing from $1,545 in 1980 to$5,360 in 2000. However, a look at the mean per capita income reveals a totally different picture: Chinese earned less than white, with a gap ranging from $466 to $1,190 in the same period. Obviously, the measure of median income tends to mask inequality. For example, the median family income for Chinese in 2000 was $60,058. It

Table 4. Indicators of Economic Status for Major Asian Ethnic Groups in Comparison to Other Racial Groups 1980-2000

Racial/Ethnic Group	Median Family Income			Median Per Capita Income		
	1980	1990	2000	1980	1990	2000
U.S.	19,917	35,225	50,046	7,298	14,420	21,587
White	21,014	37,628	54,698	7,942	16,067	24,819
Black	12,627	22,466	33,332	4,556	8,885	14,489
Hispanic	14,712	25,064	34,397	4,586	8,400	12,111
Chinese	22,559	41,316	60,058	7,476	14,877	23,756
Japanese	27,354	51,550	70,849	9,068	19,373	30,075
Filipino	23,687	46,698	65,189	6,915	13,616	21,267
Korean	20,459	33,909	47,624	5,544	11,178	18,805
Asian Indian	24,993	49,309	70,708	8,667	17,777	27,514
Vietnamese	12,840	30,550	47,103	3,382	9,033	15,655

Sources: U.S. Bureau of the Census.
1983. Census of Population, 1980PC80-1-C1: Tables 164, 170;
1993. Census of Population, 1990CP-2-1: Tables 111, 120, 129;
2001c. Census 2000 Summary File 4 (SF4): Tables PCT113, PCT130, retrieved from http://www.census.gov.

was not only higher than the national average ($50,046) but also outranked that for the non-Hispanic whites ($54,698). That is to say, the income of an average white family is $5,360 less than a comparable Chinese family, or 91.1 percent that of the Chinese. However, when measured by median per capita income, Chinese earned $1,063 less than whites, or 95.7 percent of whites' income. Of the selected groups shown in Table 4, only Japanese and Asian Indians outranked whites in terms of both median family income and median per capita income from 1980 to 2000.

Just as the measure of median family income tends to show higher earnings for Chinese, comparisons of economic status based on national data also suggest that Chinese have more disposable income than other groups, even the majority whites.

However, the comparison based on national averages overlooks the fact that Chinese and other Asian groups are geographically concentrated in states and metropolitan areas such as California and New York where income and cost of living are far higher than in the rest of the nation where the white population is more broadly dispersed. As a result of this artificial inflation, the conclusion may be misleading (Cabezas and Kawaguchi 1988; Chan 1991; Woo 1985, 1994).

For example, studies based on national data, such as those conducted by Chiswick (1983), Hirschman and Wong (1981), and the U.S. Commission on Civil Rights (1988), invariably show that American-born Chinese and Japanese men had a higher income than white men. However, Jiobu (1976), Cabezas (1979), and Moulton (1978) have documented that such was not the case in California, where 45% of the Chinese resided in 1970.

Table 5 shows annual earnings of three female groups by race and birth of place from 1960 to 2000. The census data show that in general native-borns of the three groups tend to earn more than their respective foreign-born counterparts. The statistics

Table 5. Annual Earnings (in U.S. Dollars) of Chinese American Women Aged 25-64 Compared with White Women by Place of Birth, 1960-2000

Ethnic	1960		1970		1980		1990		2000	
Group	Foreign	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign	Native
White	2,273	2,294	4,096	3,959	6,900	7,193	14,012	15,074	16,714	21,041
Chinese	2,249	2,893	4,207	5,162	7,585	10,837	16,838	24,826	22,817	37,136
Japanese	1,709	2,661	3,378	4,877	6,508	10,478	13,695	22,684	15,474	31,755

Sources: Data for years 1960 to 1990 are adapted from Mar (2000:231), Table 1.
U.S. Bureau of the Census. 2003: 1-Percent Public Use Microdata Samples (PUMS); 5-Percent PUMS.
Note: Calculation is based on a combination of the two files and includes only those claimed single race.

also indicate that foreign-born Chinese women earned $24 less than their white counterparts in 1960. However, working Chinese women--both native-born and immigrants--began to earn more than their non-Hispanic white counterparts since 1970. Mar (2000) attributed their generally higher earnings to: 1) their educational levels are higher than that of white women from 1970 onward; 2) a higher percentage of individuals is employed in the professional and technical occupations; 3) Chinese are predominantly concentrated in cities and in higher wage states out of the south, 4) compared to white women, a larger percentage of Chinese work full time, which helps to drive their median income upward.

When analyses distinguish between males and females, the labor market success also varies. For example, Kitano (1981) found that the mean income for Chinese males was the lowest in comparison with the Japanese, Filipinos, and the majority group in 1975; conversely, the mean income of Chinese females was among the highest. Kitano attributed the low income of Chinese males in conjunction with their high education to possible discrimination and the wide range of education and status in the group.

Table 6 presents the earnings distribution of employed Chinese and whites aged 25 and over in 1999. The conventional census data show that both Chinese males and females have higher earnings in terms of the median, mean, and mode, than their respective white counterparts. The data also show that higher percentages of Chinese males than their white counterparts are found at both extremes of the earnings distribution. Specifically, while 11.5 percent of Chinese male workers earned less than $10,000 in1999, 8.5 percent white males are in this category; while as much as 21.5

Table 6. Personal Earnings Distribution of Employed Chinese and Whites Aged 25 and Over by Gender, 1999

Racial Group	**Chinese**				**White**			
Gender	Male	%	Female	%	Male	%	Female	%
Median	37,000		27,000		36,000		22,500	
Mean	50,853		34,800		48,260		27,635	
Mode	50,000		30,000		30,000		20,000	
Total Earnings								
< $10,000	3,567	11.9	4,954	18.6	241,627	8.5	460,943	18.9
$10,000-19,999	4,745	15.8	5,059	19.0	342,361	12.1	580,919	23.8
$20,000-29,999	4,024	13.4	4,260	16.0	487,031	17.2	538,450	22.1
$30,000-39,999	3,579	11.9	3,865	14.5	502,050	17.7	373,645	15.3
$40,000-49,999	2,955	9.8	2,707	10.2	384,050	13.6	209,690	8.6
$50,000-59,999	2,482	8.3	1,903	7.2	264,970	9.4	111,687	4.6
$60,000-69,999	2,252	7.5	1,396	5.3	180,786	6.4	62,508	2.6
$70,000 +	6,463	21.5	2,444	9.2	431,777	15.2	98,439	4.0

Source:
U.S. Bureau of the Census. 2003: 1-Percent Public Use Microdata Samples (PUMS); 5-Percent PUMS. Calculation is based on the combination of the 1% and 5% PUMS files.

percent of Chinese males earned more than $70,000, 15.2 percent of their white counterparts are at this earning level. For females, while both Chinese (18.6%) and whites (18.9%) have about the same percentages at the lowest level of annual earnings, higher percentage of Chinese (9.2%) than whites (4.0%) is found in highest earnings category.

In sum, the unadjusted statistics from the decennial data show that an increasingly significant proportion of Chinese Americans have achieved superior socioeconomic achievement in terms of education, occupation, and earnings since the 1940s. Because of these achievements, plus low crime rates, absence of juvenile

delinquency and mental health problems, Chinese Americans, together with other major groups from Asia, are labeled as “Model Minority” (Peterson 1971; Kitano 1976).

In spite of the achievements, critics of the model minority stereotype point out that the perspective is biased. Some argue that the most important consideration for success should not be taken by educational and occupational levels, but by returns to education and occupation (e.g., Tsukada 1988). However, because of the aggregate nature of the data, the conventional statistics from the U.S. censuses do not indicate how personal characteristics and structural factors contribute to the earnings of individual workers and if the pecuniary returns are commensurate with their educational and occupational achievements. As such, appropriate analytic techniques, together with appropriate data and theoretical perspectives, are needed in order to take the relevant factors into consideration and thus shed light on our understanding of the earnings process of Chinese workers in the labor market. The following two chapters will review empirical studies conducted at individual and structural levels, respectively.

CHAPTER III

INDIVIDUAL CHARACTERISTICS AND EARNINGS

Not only the conventional statistics from the census data but also empirical studies regarding the degree of Chinese American economic progress have been marked by a lack of consensus among social scientists. Some argue that Chinese Americans are on the way to, or achieved, substantial earnings parity with the majority whites as early as the 1970s (e.g., Chiswick 1983; Hirschman and Wong 1984; Nee and Sanders 1985). Others contend that Chinese Americans, along with other Asian groups, have never reached economic parity with whites and continue to face discrimination (Hurh and Kim 1989; Woo 1985; Duleep and Sanders 1992). Although mostly based on census data, various empirical studies provide support for each of these positions.

Discrepancies between the findings of these two streams of studies may have resulted from the two different research traditions that guided the data analyses. One tradition typically employs an individualistic approach such as the human capital model, and the other applies macro or structural modeling. This chapter reviews the individualistic approach with main focus on human capital, immigration/assimilation, discrimination, and the empirical findings about the earnings of Chinese workers in the United States. The chapter closes with a summary of the empirical studies in this regard. The next chapter addresses the macro approach that emphasizes structural or ecological factors in shaping the socioeconomic outcomes of racial and ethnic groups in the United States.

Human Capital

Human capital refers to all knowledge and skills that serve to increase an individual's productivity in the labor market (Becker 1964). Rooted in economics and intimately related to the study of income distribution, human capital can be one of the most important elements in determining an individual's earnings in the labor market. "Just as physical capital is created by changes in materials to form tools that facilitate production, human capital is created by changes in persons that bring about skills and capabilities that make them able to act in new ways" (Coleman 1988:100). To make the "changes" so as to maximize lifetime income, workers as rational actors make investments in such productive capacities as formal education, on-job training, labor market experience, language facility of the host country, and even migration, among others. As one of the major research traditions in the analysis of individual earnings determination, the human capital model tends to stress the individual variation in these investments rather than the environment or context in accounting for earnings inequality in the labor market. That is to say, initial and continuing investments affect individual's productivity: more investment in human capital should bring about better market standing for an individual and this kind of uniform exchange value is not subject to the influence of context.

The costs and returns to those investments are generally measured by earnings differentials in the labor market. The standard estimation has been the "Mincer" (1974) equation: $ln(income) = a + b_1*Education + b_2*Experience + b_3*Experience^2 + error$, which depicts the log of income as a linear function of education, post-school work

experience and a quadratic experience term to capture decaying rates of return over time. The independent variables in the equation represent human capital investments or average "productivity" characteristics of individual workers, while the regression coefficients b_2 and b_3 are the "returns" for each investment.

With an increasing recognition of the importance of investment in people as an underlying principle in theory and empirical analysis of income distribution, the initial Mincer equation (Mincer 1974) has been expanded and improved by including more relevant explanatory variables in the estimation. Some of the variables are labor supply and demographic characteristics related to earnings, namely, gender, race and ethnicity, family background, annual weeks worked, employment status, employment continuity or discontinuity, marital status, the presence of own children, and so forth. Interactions of education and labor market experience, non-linearities in schooling are taken into consideration so as to avoid or reduce biases in the estimated returns to education on the one hand, and to measure explicitly the effects of other important factors on earnings on the other. Moreover, the approach has been extended to the study of immigrant earnings. This approach was popularized by Chiswick (1978) who incorporated into the standard Mincer equation a series of immigrant variables such as birthplace, duration of stay in the destination country, and language proficiency. Also, human capital theory has implications for pay differences within and between occupations.

In sum, after many years of development, the human capital approach has been capable of explaining not only earnings variation between sexes, across occupations and regions, but also the different earnings distributions within and among racial/ethnic

groups in terms of ascribed and achieved statuses that individual workers bring to the labor market. This approach has been such an indispensable component in the analysis of the economic outcomes of individuals that "No income distribution theory can claim to be complete without taking the dynamic nature of human capital into full account" (Sahota 1978:14).

The basic hypothesis of human capital theory is that the less investment in an individual, the lower his or her earnings. Empirical findings on the effects of the major human capital components--education and labor market experience--are presented below.

Educational Attainment

As mentioned above, education is one of the major constituents of human capital. After the generic works of Becker (1964) and Mincer (1958, 1974), education is mainly seen as an investment in human capital with both costs and returns. The major cost is that the time invested in obtaining education will postpone the productive age to a later year, and the main return is that the education obtained will create better chances for economic success for individuals. Indeed, for nearly five decades the literature reports strong positive returns of education on individual economic outcomes[1] (Karasiotou 2003). The popular conception of Asian Americans as a "model minority" generally

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[1] But there are studies showing that education has no effect on earnings attainment. For example, in a study based on the 1970 California Public Use Sample, Jiobu (1976) found that the education variable did not have a statistically significant effect on the earnings attainment of Chinese workers in California. The author noted that this insignificant effect might result from small sample size.

attributes their achievement to individual investments in education and occupational preparation (Tsukada 1988).

Probably because of its importance in the earnings equation, education has been one of the best-documented human capital variables in literature. As reviewed in Chapter II, in general Chinese have achieved almost equivalent or higher standing in educational achievement than whites since the 1960s. However, empirical findings on the return to education among Chinese are varied, even if some of them are derived from the same data sources. The following are some of the major findings presented mainly in the chronological order of the census data. It is noteworthy that the literature on the socioeconomic status of Chinese in the United States is sometimes embedded in "Asian Americans" because of small sample size or the aggregate nature of the data. As such, this review includes findings about Asian groups as an entity, although the generalization of the conclusion down to the Chinese may be problematic.

Educational achievement is generally equated with economic advantage. Some studies show that compared with majority whites, Chinese Americans have an equitable conversion of educational attainment into earnings in the labor market. For example, Chiswick's (1983) study based on 1970 Census data showed that Chinese men born in the United States had higher levels of schooling than white men and that the effect of schooling on earnings was very similar for Chinese, Japanese, and whites: with each additional year of schooling completed, Chinese men enjoyed a 6.7 percent increase in earnings, Japanese a 6.5 percent increase, and whites 6.9 percent increase in 1969. He concluded that there were no substantive group differences in returns from schooling.

Restricted to California where Chinese and other Asian groups are heavily concentrated, Nee and Sanders (1985) suggested that native-born whites, Japanese, and Chinese Americans enjoyed impressive returns to their educational investments in 1979. Specifically, these groups received on average $904, $900 and $770, respectively, for each extra year of schooling completed. In spite of the somewhat lower return to education than whites, they concluded that Chinese Americans were on the road to earnings parity with whites.

However, other studies suggest that the educational advantages of Chinese Americans do not necessarily imply corresponding economic advantages as commonly assumed. Some evidence suggests that the economic reward of education for Chinese Americans is limited, compared with that of majority individuals. For example, the U.S. Commission on Civil Rights (1978) looked into the costs of being non-white, using 1960 and 1970 census data together with data from the 1976 Social Indicator Survey. The analyses indicated that for Japanese and Chinese Americans, both the occupational returns of their educational achievement and the income returns of their educational and occupational attainment were lower than those for the white majority. Specifically, the adjusted incomes for Chinese, other non-whites and women had actually declined relative to that of whites from 1959 to 1969. The report concluded that although Asian Americans enjoyed high incomes, whites still had an earnings advantage after adjusting for education. Also based on the 1960 and 1970 census data, Wong (1980) found that although Chinese men were much better educated than whites, their earnings were not commensurate with their education achievement.

Using Census data for 1960 and 1970 and data from the Survey of Income and Education in 1976, Hirschman and Wong (1981) compared Japanese, Chinese, and Filipino workers with whites and blacks. Their result showed that the older generation of Asian Americans was less educated than whites, but younger generations enjoyed much higher educational achievement than their white counterparts. They also found that Chinese were more likely than whites to be employed in professional occupations, but they earned far less than their white counterparts after controlling for education.

Using the same data files, Hirschman and Wong (1984) found that for both earnings and occupational attainment, education proved to be the primary determinant of racial and ethnic differentials. Specifically, the substantial share of Asian American males' economic success arose from their above average educational attainments; and it was also through this overachievement in education that Asian Americans surpassed most other minorities and reached socioeconomic parity with the majority population. However, when Asian educational levels were adjusted to the national level, their average earnings declined by about $1,000 in 1975. This is to say, Asian Americans experienced an under-utilization of educational resources for their employment or failed to convert efficiently their high educational achievement into earnings commensurate with their educational level. However, Sakamoto and Furuichi (2002) contended that Hirschman and Wong's findings might be misleading because their analysis assumed the effects of schooling to be the same for both the native born and foreign born despite past research suggesting that schooling acquired overseas is often not entirely equivalent to

that obtained in the United States (e.g., Duleep and Regets 1997; U.S. Commission on Civil Rights 1988).

Gwartney and Long (1978) are among the first scholars to examine the earnings of a large number of racial/ethnic groups. Based on the 1 percent PUMS data files for 1960 and 1970, they estimated a human capital model of earnings for each of nine selected racial/ethnic groups by gender and then analyzed the earnings gap for each group using standard decomposition techniques. Their regression results indicated that the impact of education on earnings varied with the level of schooling. The rate of return to male workers increased with schooling in every racial group. Specifically, holding constant other variables (age as a proxy of market experience, marital status, hours worked, residence, nativity, English language ability and region) in the earnings model, Chinese men benefited the most from completing an additional year of education at higher schooling levels; at lower schooling levels, the effect was the largest for white males. Chinese females were one of the groups that experienced increasing returns as their education increased. However, the decomposition analyses indicated that both Chinese males and females earned less than their respective white counterparts.

Using 1980 Census data, Carlson and Swarts (1988) replicated the study of Gwartney and Long (1978). Their findings were based on an analysis of 12 racial and ethnic groups and generally were in agreement with Gwartney and Long's estimates for 1969 annual earnings: when measured at 16 years of education, Chinese men had the highest rate of return to education, but they still earned less than white men. For women, Chinese women are one of the six minority women who earned more than their white

counterparts. They attributed this earning advantage to education, hours worked, and proportion of foreign-born immigrants. Their finding for Chinese women is consistent with Wong and Hirschman's (1983) seminal study on Asian women's incomes using 1970 census data. Apart from their better education, Wong and Hirschman also attributed the Asian American women's modest income advantages over whites to their being younger and more likely to live in metropolitan areas than their white counterparts.

The lower earnings of Chinese men in Gwartney and Long's (1978) estimate for 1969 and Carlson and Swarts' (1988) estimate for 1979 may be due to the inclusion of foreign-born men in both samples. That is, both studies lumped foreign-born together with U.S. born in their analyses. Indeed, the bulk of the literature shows that immigrants, recent immigrants in particular, typically earn less than their native-born counterparts. This distinction is particularly important because the majority of Chinese in the United States are foreign-born.

For the lower earnings of Chinese and other minority groups, some turn to an explanation of racial discrimination in the labor market. Cabezas and Kawaguchi's (1988) study serves as the major support for the view that Asian Americans continue to face substantial racial discrimination in their labor market opportunities. Using 1980 census data, they compared personal earnings of various Asian American ethnic groups, namely, Chinese, Japanese, Filipino, and Korean Americans with U.S.-born whites in the San Francisco-San Jose-Oakland Standard Consolidated Area, a traditional settlement area for Chinese. Their regression results showed that for younger Asian American men

(25-44), more education and experience raised income but with a low return; for those older (45-65 and over), mostly education and hours worked increased income; for most Asian American women, younger or older, income derived almost entirely from hours worked—with education contributing little because of low returns.

Although Cabezas and Kawaguchi's study provides insight into the earnings mechanism of Asian Americans, generalization to Asian Americans residing elsewhere in the country is limited by the regional data.

In an attempt to overcome the shortcomings in the studies by Hirschman and Wong (1984) and Cabezas and Kawaguchi (1988) as well as to examine the common view that Asian Americans must achieve a higher level of educational attainment in order to obtain comparable wages, Sakamoto and Furuichi (2002) pooled together the Current Population Survey (CPS) data for 1994 through 1998 to obtain a large sample of Asian Americans. Their study was limited to native-born Asian Americans and compared the wages of Asian Americans with those of non-Hispanic whites. Log transformation was applied in order to improve the fit of the regression model. Separate regression models were estimated for men and for women to allow for the effects of the independent variables to vary by gender. Their multivariate regression results showed that neither Asian men nor women were underpaid relative to whites who were comparable in terms of gender, experience, education, and place of residence. In general, the mean hourly earnings of Asian Americans were at least as high as those of whites. Specifically, the results for men did not support the common view, except at the doctorate level. That is, mean wages among men who had less than a doctorate degree

(which consisted of about 95 percent of all male workers) were not consistently lower for native-born Asian Americans, a finding similar to that of Barringer and associates (1993) based on 1980 census data. They found little evidence to indicate that native-born Asian Americans must have higher educational attainments than whites to obtain equivalent wages. Sakamoto and Furuichi further argued that these results were consistent with Wilson's (1980) thesis of the declining significance of race; instead, class characteristics, in particular educational attainment, have become a more important role than racial status per se in determining wages in the labor market.

Although they tried to overcome methodological limitations found in others' research, Sakamoto and Furuichi's research is not perfect. Because their data do not distinguish between the specific groups of Asian Americans, they can only examine the population of Asian Americans as a single entity. Consequently, their conclusion cannot be automatically applicable to a particular Asian group, owing to the heterogeneous cultures and immigration histories of the Asian Americans (Gardner, Robey, and Smith 1985; Barringer, Takeuchi, and Xenos 1990). Another shortcoming is that since their study is limited to the native-born Asian Americans, little is known about foreign-born immigrants who constitute the majority of the Asian population in the United States.

Motivated by Hirschman and Wong's (1984) study and that of Sakamoto and Furuichi (2002), Zeng and Xie (2004) proposed that Asian Americans earn less than their white counterparts because many immigrants obtained their education in their home countries, and foreign education is less valued in the U.S. job market than that acquired in the United States. They tested their hypothesis using a sample of 25-44 year old male

workers extracted from the 1990 PUMS data, and supplemented by data from the 1993 National Survey of College Graduate. They divided Asian Americans into three subgroups: U.S.-born Asian-Americans, U.S.-educated Asian immigrants, and foreign-educated Asian immigrants, and compared them with U.S.-born whites. Their analysis showed that there was no earnings difference across U.S.-born whites, U.S.-born Asian-Americans, and U.S.-educated Asian immigrants. However, they did find a disadvantage associated with being foreign-educated Asian immigrants: on average they earned 16 percent less than the other three groups of workers, net of other relevant factors.

Zeng and Xie concluded that the place of education plays a crucial role in determining Asian-Americans' earnings, while race and nativity per se do not have any significant impact on Asian-Americans' earnings. Following Zeng and Xie's (2004) interpretation, due to the fact that a large proportion of Chinese immigrants had completed their formal education before they immigrated to the United States, previous studies that have found an earnings disadvantage associated with being either Chinese American or Chinese immigrant may have picked up the effect of place of education, instead of ethnicity, as Wong (1982) claimed.

Labor Market Experience

Although labor market experience has been a major component in the standard human capital model (Mincer 1974), the empirical study of its effect on the economic outcomes of Asian Americans is limited. This is probably because most of the empirical research has been based on census data which are known for not containing labor force

experience information. Even if it is possible to approximate labor experience by taking away the years of schooling and pre-school (typically 5 years) from current age (Chiswick 1978), two issues remain. One is collinearity. Since these two variables are highly correlated, one can include only one of them in the model [2]. Sometimes, age is used as a proxy of labor force experience.

Another salient issue is associated with "the problem of estimating labor market experience for women" (Chiswick 1978:898, note 2). The labor force participation will typically discontinue for a period of time when women begin to have children. Consequently, the above method, which assumes continued labor force participation, has been generally not applicable to female workers.

In general, the few empirical studies find that labor market experience has a positive impact on the earnings attainment of individual workers; some show a decaying effect among older age groups. For example, using 1970 census data, Chiswick (1983) found that the effect of labor market experience on earnings differed by race. When gauged at 10 years of experience, an additional year of labor market experience raised the earnings of the Chinese by 3.3 percent, the Japanese by 2.1 percent, the whites by 2.1 percent, and the Filipinos by 2.0 percent. Regarding the higher returns for the Chinese, Chiswick speculated that the Chinese benefited from either making larger dollar investments in each year of on-the-job training or from being more successful in

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[2] With some proper treatment, some studies did include labor experience in their models, but only as a control and its regression coefficient is not always reported (e.g., The U.S. Commission on Civil Rights 1988; Poston 1994).

obtaining returns from this training.

Also using 1970 census data, Gwartney and Long (1978) included age in dummy form (age 35-44 as reference) as a proxy for work experience in their study of the earnings of black and other minorities. Their results showed that for Chinese men, age groups of 18-24 and 25-34 earned less than those aged 35-44; for Chinese women, the younger age groups (ages 18-24 and 25-34) and an older group (age 55-64) earned about 20 to 42 percent less than the reference group. The authors also noted that age might be a poor proxy as a measure of female work experience because of the variation of female labor participation over the life cycle.

Replicating Gwartney and Long's 1978 study with 1980 census data, Carlson and Swartz (1988) also included age in their model as a proxy for potential work experience. Their OLS regression results showed that for most groups the estimated log earnings-age profile was characterized by the usual inverted-U shape. Specifically, for Chinese men of ages 45-54 and 55-64 the effect on earnings was positive and for women workers the effect was the largest for age 45-54.

Barringer and colleagues' (1993) analysis based on 1980 5 percent PUMS data indicated that labor market experience (age as proxy) made a positive contribution to the personal income of Chinese individuals (men and women combined). Specifically, the unadjusted regression coefficient showed that each additional year of work experience increased income by $0.14. Its adjusted value was 0.13, lower than other major explanatory variables such as education (B=0.23), occupation (B=0.19).

Cabezas and Kawaguchi's (1988) study based on 1980 census data for California

showed that among U.S.-born persons, the returns on labor market experience for all Asian American women as well as white women were low. Specifically, their analysis suggested that work experience was not an important factor for the older group (aged 45-65 and over), since older persons presumably had ample work experience. As such, experience showed a negative return for foreign-born Chinese women in 1979.

Immigration, Assimilation, and Earnings

As part of the melting pot of the United States, the Chinese American population is composed of a large proportion of foreign-born persons. For example, the U.S. Bureau of the Census (2001b) reports that 62.5 percent of Chinese in the United States were foreign-born in 2000. As such, immigration is another important element that may shape the earnings pattern of Chinese workers in the U.S. labor market. And associated with the process of immigrants' adjusting and adapting to the host society are their strengths and disadvantages. Chiswick (1980) noted that migrants are typically self-selected individuals with greater innate ability, greater motivation for personal economic success, and are more willing to sacrifice current consumption to make investments that may increase future consumption. Moreover, the 1965 Immigration Act further stresses the productive characteristics of individuals for admission into the United States. As a result, although coming from diverse socioeconomic backgrounds, many new immigrants entering the U.S. labor market may be endowed with certain readily transferable resources, such as education, labor market experience, and occupational skills, that would enable them to avoid the unilateral bottom-up path and to integrate directly into

the middle or upper middle class (Portes and Rumbaut 1990). Combining transferable skills and high self-motivation, other things being equal, immigrants are expected to have higher earnings than their native-born counterparts in the destination.

However, empirical research finds that in general the status of foreign birth has a negative impact on earnings for Chinese Americans. For example, Gwartney and Long's (1978) analysis based on census data for 1960 and 1970 showed that the negative effect of foreign birth was the largest for Japanese and Chinese of both sexes. Chiswick's (1980) study using 1970 census data indicated that although by 1969 Chinese Americans nationwide appeared to have pulled roughly even with whites in average earnings and native-born Chinese Americans even reported having higher average income than native-born whites, immigrant Chinese reported earnings somewhat less than white immigrants. Hirschman and Wong's (1984) study based on census data for 1960, 1970 and 1976 showed that the Chinese men in general earned slightly less than whites—they received on average $2,000 less than white men did. They attributed a good share of the gross disadvantage of Chinese men to their nativity and age composition, because a majority of Chinese workers were immigrants.

An often-cited study by The U.S. Commission on Civil Rights (1988) also reported the effects of birthplace on earnings of Asian Americans. Based on microdata samples from the 1960, 1970, and 1980 censuses, as well as records from the Immigration and Naturalization Service, the report basically concluded that Asian Americans, regardless of nativity, had achieved essential parity with whites. Specifically, the study found that both the average annual and hourly earnings of native-

born Chinese, Japanese, and Korean males were higher than those of their non-Hispanic white counterparts. After adjusting for productivity-related characteristics such as schooling, labor market experience, region of residence, and urban location, native-born Chinese men were found to earn 5 percent less per year than non-Hispanic white men with similar characteristics. However, when compared on an hourly basis, native-born Chinese men earned as much as or more than non-Hispanic white men with comparable characteristics. For native-born women, Chinese earned on average 52 percent more per year and 34 percent more per hour than their white counterparts. After adjusting for education, years of labor market experience, commitment to work force, and other relevant characteristics such as geographic location, native-born Chinese women were found to earn as much as or more than their non-Hispanic white counterparts.

The report also compared the earnings of foreign-born Asian and non-Hispanic white men. It showed that after adjusting for productive characteristics such as education, work experience, region of residence, urban location, year of immigration, and other relevant variables—three patterns surfaced: 1) except for the Japanese, Asian immigrant men initially earned less than their non-Hispanic white counterparts, 2) with time in the United States, the earnings of Asian immigrant grew more rapidly than the earnings of non-Hispanic white immigrants, and 3) recent immigration had a depressing effect on the incomes of Asian immigrant men; however, those who were in the United States for 11 years or more often earned nearly as much as or even more than their non-Hispanic white counterparts.

The report showed that the annual and hourly earnings of foreign-born Chinese,

Japanese, and Asian Indian women all exceeded the earnings of their white counterparts by 10 percent or more. After adjusting for education, English language proficiency, commitment to the work force, and other relevant variables, the study suggested that the earnings of Asian immigrant women approached or surpassed those of non-Hispanic white women with comparable characteristics. In contrast to the findings for foreign-born men, the assimilation experience of Asian immigrant women was not marked by lower initial earnings than their white counterparts.

Some other studies based on 1980 census data also reached conclusions similar to those of the U.S. Commission on Civil Rights (1988). For example, Poston and Jia (1989) noted that male workers from some major Asian-origin groups such as Japanese, Chinese, often enjoyed higher returns to their human capital than native whites, while Koreans, Vietnamese and some other smaller groups experienced earnings disadvantages compared to their white counterparts. Barringer and associates' (1993) study also showed that nativity had accounted for the earnings disadvantage for those Asian groups such as the Chinese with a large proportion of recent immigrants. A regional study by Nee and Sanders (1985) also suggested that on average native-born Chinese earned nearly as much as native whites in 1979; however, Chinese immigrants reported $5,000 less than their native counterparts.

Yamanaka and McClelland's (1994) analysis based on 1990 census data indicated that American-born Chinese women had come a long way towards parity with their white counterparts in their income attainment patterns. Chinese immigrants in various ways appeared to bear the marks of their immigrant status: recency of

immigration, level of schooling, and fluency in English language had relatively large effects.

Iceland (1999) claimed his study to be the "first to systematically" examine by Asian ethnicity and gender whether Asian Americans receive lower earnings returns to their occupational status than non-Hispanic whites. He found that native-born Asian men and women of various ethnic groups did not earn significantly less than comparable native-born non-Hispanic whites. Only foreign-born Asian men were disadvantaged relative to native-born non-Hispanic white men.

In sociological literature, human capital model is extended to study the earnings attainment of immigrants (Chiswick 1978). By including the duration of residence, the conversion of educational attainment, and the command of the dominant language, the model is usually used to capture the dimensions of the economic adjustment process among immigrants. The following sections present the empirical findings in these regards.

Duration of Stay

The empirical findings presented above show that recent immigrants often earn less than their native counterparts, and the majority whites (e.g., Wong 1980; Carliner 1980; Barringer et al 1993). This is because when immigrants enter a new society they often encounter barriers or disadvantages that may prevent or slow down their full access to or integration into the labor market in the host country. For example, American employers generally do not recognize the immigrants' credentials and work experience

obtained in their home countries (Kim, Hurh, and Fernandez 1989); there may be laws or licensing regulations that bar the entry of immigrant workers to professional or internal labor markets on the ground of unaccepted foreign credentials. Further, most recent immigrant groups may be disadvantaged by a lack of both social and human capital in several respects. For social capital, recent immigrants may not have a social network necessary to get ahead in the mainstream economy and society (Chiswick 1978; Min 1984). For human capital, immigrants may or may not have more years of schooling than natives, and the quality of their schooling acquired in their home country may vary (Carliner 1980; Zeng and Xie 2004). Even if they have high quality education and credentials or occupational skills obtained outside the host country, immigrants may still have difficulty in transferring them to the U.S. labor markets either because their formal education is too country-specific (e.g., law, language) or their skills or trainings are too concentrated in specific occupations and thus not well matched to the needs of the employers in the host society (Chiswick 1978, 1980; Carliner 1980; Waters and Eschbach 1995). At the same time, they may experience serious language problems, various forms of culture shock, and discrimination in one way or another (Bonacich, Light, and Wong 1977; Hurh and Kim 1984). Consequently, immigrants are forced either to take jobs at the bottom of the occupational hierarchy that are undesirable to the natives, or to initiate self-employed businesses in order to improve their economic status. For example, although a large proportion of post-1965 Asian immigrants from China, Korea, the Philippines, and other South Asian countries are highly educated and from urban backgrounds, many experience downward mobility. Because of the non-

recognition of foreign credentials and coupled with a lack of English facility, they have to take relatively low-paying jobs or go into small enterprises such as groceries, restaurants, and cleaners (Glenn and Parrenas 1996).

In spite of the barriers and disadvantages associated with their status as outsiders or foreigners, immigrants are not necessarily trapped forever in the lowest end of the social stratification system in the destination. According to the assimilation perspective, sufficient length of time in the host country should not only diminish cultural and socioeconomic differences between natives and immigrants but also promote their overall integration into mainstream society (Chiswick 1980; Borjas 1990). That is, during their stay in the host country, immigrants learn about the institutional aspects of the host labor market and social customs, develop networks of labor market, invest in marketable human capital skills, attain economic parity with their U.S.-born counterparts, and eventually proceed to other stages of the assimilation process specified by Gordon (1964).

Traditionally, assimilation is usually measured by the duration of residence in the host country. Empirical research of this success-through-assimilation often finds that the initial lower earnings of minority or immigrant workers typically rise with duration and accumulation of labor market experience in the host country. For example, in his study of immigrant earnings patterns in the late 1970s, Chiswick (1978) found that in 11 to 16 years after immigration, male immigrant workers were able to achieve earnings parity with their U.S.-born counterparts. In another similar study, Chiswick (1980) found that other things equal, typically, the earnings of economic migrants, such as Mexican

Americans and Filipinos, equaled those of the native-born (or those with native-born parents) of the same racial and ethic group after approximately 11 to 15 years in the United States. The report by the U.S. Commission on Civil Rights (1988) also showed that immigrants who have been in the United States for 11 years or more often earned nearly as much as or even more than their non-Hispanic white counterparts. However, the earnings of Chinese male immigrants approached but did not equal the earnings of native-born Chinese Americans, even after three decades in the United States (Chiswick 1980).

Other empirical studies based on census data also tend to show that generally Chinese Americans benefit from their longer presence in the country despite their initial earnings disadvantage. For example, Carliner's (1980) analysis of 1970 census data for eight ethnic groups indicated that, other things being equal, recent immigrants generally received lower wages and earnings than second generation workers, but second generation workers received higher wages and earnings than third generation workers, and that the Chinese harvested the highest rewards to education. Increases in schooling were an important part of the increment in human capital over the generation for Chinese. Based on 1980 PUMS data, Barringer and colleagues' (1993) analysis of the determinants of personal income indicated that the period of immigration had the greatest adjusted effect for Chinese, a large number of whom were recent immigrants. They found that new immigrants earned the least, and older immigrants earned more than natives.

Education

Although duration of stay is often used to indicate the degree of assimilation, it is education that is regarded as a most powerful assimilative force. Indeed, the general role of education in the achievements of immigrants and minorities is important for assimilationists (Gordon 1964; Park 1950). They generally assume that education, the major human capital, reduces not only the boundary between minority and majority but also the boundary between natives and foreign-born. While helping minority or immigrants to become assimilated culturally, structurally, biologically and psychologically (Gordon 1964, 1978), education also contributes to their socioeconomic attainment in the process. This is because educated persons are generally more acceptable to dominant group members; education facilitates the overcoming of language and culture barriers which prevent their access into broader social circles; more important, it helps break segregation and discrimination practices and eventually narrows socioeconomic inequalities (Portes 1984).

Empirical research on the effect of education on the earnings attainment of Chinese immigrants has tended to portray a positive effect, though a lower return for newcomers. Using 1980 5 percent PUMS data on a sample of males and females aged 25-59, Poston (1988) compared the human capital conversion capabilities among and between Asian and other foreign-born immigrant groups and gauged how well Asian Americans were able to convert their educational status into earnings. His regression results showed that Chinese male workers born in Taiwan obtained $0.67 per hour for each extra year of schooling completed; women workers born in the same place had a

conversion rate of $0.28. The rates for Chinese males and females born in Mainland China and Hong Kong were $0.59 and $0.33, respectively.

Using the same data, Poston (1994) examined the contribution of human capital to earnings of U.S. immigrants from 92 countries. He found that educational attainment was the most influential predictor across 78 out of the 92 specific regression models and lended support to the already numerous findings in the sociology and economics literature about the key role of education in the earnings attainment process of immigrants. His regression results showed that men born in China converted their education (measured as number of years of schooling completed) into earnings at a rate of $672.

Chiswick's (1980) analysis of 1970 census data showed that other things equal, the schooling of foreign born had a smaller effect on U.S. earnings than skills acquired by the native born. Specifically, among white men, an additional year of schooling completed raised the earnings by 7.2 percent for the native born and 5.7 percent for the foreign born. For Chinese men, the effect was relatively smaller: 6.7 percent increase for the native-born and 4.8 percent for the foreign born. However, the partial effect of schooling on earnings was larger for immigrant whites and blacks from English-speaking countries than for those from other countries, reflecting the greater transferability of the skills acquired in the country of origin.

Wong's (1986) study also showed similar findings. He found that despite their higher achievements in education and occupation, recent Asian immigrants earned on average less than their U.S. counterparts. He attributed the unequal returns to human

capital to potential discrimination against Asian immigrants in 1980 at the aggregate level.

Nee and Sanders' (1985) regional study using 1980 census data for California showed that both native born and immigrant Chinese with a minimum of four years of college had similar earnings on average, whereas for those with less than college degree, immigrants typically earned substantially less than their native born counterparts.

Also using 1980 census data for California, Cabezas and Kawaguchi's (1988) study uncovered an income inequality for most Asian American men and women, particularly foreign-born Chinese, Filipino and Korean Americans, both younger and older in the San Francisco Bay Area. Their analysis suggested that low returns on the Asian's human capital investments rather than deficiencies in their investments accounted for about two thirds of the income gap relative to U.S. born white men. Their results also showed that among U.S.-born, the returns on education and experience for all Asian American women as well as white women were low.

English Language Ability

The ability to speak the dominant language in the host country is another variable used to measure the degree of individual assimilation into the society.

At the same time, as an important form of human capital, language skills "satisfy the three basic requirements for human capital: they are embodied in the person; they are productive in the labor market and/or in consumption; and they are created at a sacrifice of time and out-of-pocket resources" (Chiswick and Miller 1995:248).

However, as shown in the standard Mincer (1974) equation, language facility was not considered to be a productivity-related characteristic at the beginning. This is not a surprise, since previous research on employment and socioeconomic achievement had tended to focus on blacks or whites whose language ability was taken for granted in the United States, and scant attention was devoted to the labor market experience of other minority groups or immigrants who must go through all kinds of adjustment in the host society. Chiswick and Miller (1995) noted that it has become recognized only in recent years that linguistic adjustment is an important aspect of the overall adjustment of immigrants in the labor market. Linguistic adjustment is a process by which immigrants who are not good at the host country's language improve their fluency and eventually integrate into the mainstream society.

Previous research investigating immigrants' language ability has tended to expand the human capital model and consider language acquisition as an investment intended to improve labor market success (Chiswick 1978, 1991). In the human capital framework, language is instrumental in nature. For a U.S. immigrant, lack of a good command of the English language would put him or her at a disadvantage in a number of ways [3]. For example, in the job-hunting stage, deficiency in English language may prevent a prospective employer from obtaining information about a worker, and the job-seeker may have difficulty in obtaining job information (Park 1999). As a result, this

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[3] However, English language may not be needed if a minority individual lived and worked in an ethnic community such as Chinatown within a large urban area.

language deficiency may simply keep him or her out of the larger labor market at the very beginning. Even when lucky enough to land a job, English deficiency would make it difficult to transfer one's training or skills obtained abroad to the U.S. labor market. Besides, most jobs require communication to a varying extent especially regarding the need to interact with colleagues or supervisors, customers, and to learn how to operate machinery. Inability to communicate in words is a lack of human capital and may thus lower productivity (Chiswick and Miller 1995, 1998; Tainer 1988; Kossoudji 1988; Stolzenberg 1990; Stolzenberg and Tienda 1997). Non-English speakers are also likely to have limited mobility, both occupationally and geographically (Park 1999). There is also evidence that immigrants lacking English proficiency face discrimination in the U.S. labor market (Reimers 1983). In a word, one's English ability is likely to affect his or her job opportunities as well as earnings attainment.

Although language facility has been considered a determinant of earnings among minority workers and immigrants, empirical studies show mixed results. Studies by McManus, Gould, and Welch (1983), Tienda and Neidert (1984), Grenier (1984), McManus (1985), Kossoudji (1988), Tainer (1988), Chiswick (1978, 1991), Sotolzenberg (1990), and Park (1999), among others, have found English ability to be indeed an important factor in determining the earnings of immigrants. For example, using data from the 1976 Survey of Income and Education, Park (1999) examined the effect of English proficiency on immigrants' return to education and experience obtained before and after migration. She found that English language was an important determinant of the earnings of immigrants: for immigrants whose first language was

English or who had a good command of English, English fluency was valuable in facilitating the transfer to the U.S. labor market of education and work experience obtained abroad. For immigrants whose mother tongue was not English, especially for those speaking poor English, the importance of English ability was best viewed as a type of general productive human capital that they should invest in early in their years in the United States.

However, other studies, such as those by Gwartney and Long (1978), Carliner (1980), Reimers (1983), and Borjas (1984), among others, concluded that English language skill is not a significant factor in immigrants' labor market success in the United States.

Relevant empirical findings about the effect of language proficiency on the earnings of Chinese workers in the United States are relatively scant. The few empirical studies produced positive results. For example, based on the data from 1980 California Public Use Sample, Cabezas and Kawaguchi (1988) found that proficiency in English language raised income for foreign-born Chinese men and women. This finding based on the regional data was supported by Poston's (1994) research using national data for the same year. Specifically, he found that although high levels of English language proficiency did not always translate into high earnings for foreign-born males from 92 countries in the United States, he did find that male workers born in China with a good command of English language earned $2,473 more than those who did not have such a command in 1979.

Based on data from the 1976 Survey of Income and Education, Tainer's (1988)

study also suggested that compared with other racial/ethnic groups, the inability to speak English hurt the earnings of Asian-born men the most.

Discrimination and Earnings

As indicated in the above review, historically, Chinese in the United States suffered not only discriminatory treatment in immigration policies limiting their entry but also practices constraining their socioeconomic mobility. The bulk of the sociological literature has shown that racial inequality in socioeconomic attainment has generally been a result of discrimination in the labor market. Discrimination results from competition for scarce resources and space. Although discrimination may incur costs on firms or employers (Becker 1971), racial discrimination also leads to a reduction of the range and quality of economic opportunities available to minority members, thereby hampering their socioeconomic upward mobility.

Discrimination in the labor market is difficult to measure empirically. In spite of this, it is naïve to conclude that no discrimination exists in the labor market. As such, studies tend to attribute to racial discrimination the unexplained differences between racial and ethnic groups in the earnings determination models, such as the human capital and assimilation models (Zhou and Kamo 1994).

Early studies have tended to show that Chinese pay the cost for their minority membership. For example, Jiobu's (1976) study on the cost of minority membership for the various groups in California in 1970 indicated that the cost of being Chinese was very high ($1,616), higher than that for Blacks ($776) or Chicanos ($1,081). That is, if

the Chinese and other minorities had the same means and rates of returns on age, education, and occupation as Anglos, blacks would earn more than Chinese and Chicanos, though still less than Anglo males. The author speculated that the high cost of being Chinese was probably because of their high level of education and occupational status, but low return on background characteristics relative to Anglo males.

Featherman and Hauser (1978) produced findings similar to those of Jiobu (1976): the net cost of being Chinese and Japanese in 1972 was about $2,259, the highest among all racial and ethnic groups.

Wong (1982) also showed similar findings when he compared the cost of minority membership based on 1960, 1970 and 1976 census data. His analysis showed that in 1959, Anglo males had higher mean earnings than all three Asian groups (Japanese, Chinese, and Filipinos) under study; in 1969, the mean earnings of Chinese were still lower than Anglo males. For 1959 and 1969, Anglo males had higher average earnings than Chinese for almost all educational categories. Since 1970, Chinese have completed a greater number of years of schooling than Anglo males. The high educational attainment was also reflected in their slightly higher occupational status relative to Anglos. However, the higher educational and occupational attainments of Chinese did not have accordingly higher mean earnings than Anglos in 1975. The author attributed this earnings disadvantage to the cost of being Chinese. He found that the cost of being Chinese was relatively substantial and stable from 1959 to 1975. That is to say, an individual Chinese-American male could not expect to earn as much as an Anglo male with the same generational status, number of years of completed education, and

general level of employment. This may be due in part to their high educational and occupational achievements. At the same time he speculated that the cost may be reflecting: 1) the heavy concentration of Chinese in certain ethnic enterprises, which, although having high socioeconomic status (such as ownership or proprietorship of a small, ethnic, mom and pop grocery store or restaurant), may reap very low income and earnings; 2) the lesser degree of acculturation of the Chinese even though they have been in the country for generations; or 3) the continued prejudice and discrimination against the Chinese.

Using 1960 to 1990 PUMS data, Mar (2000) simulated Asian American women's (Chinese, Japanese and Filipinos) earnings using parameter estimates derived from white women's human capital regressions for each of the census years. The differences between simulated earnings and actual earnings were used as a measure of discrimination in the labor market. His results showed that when earnings were unadjusted, the Asian women enjoyed an advantage over their white counterparts; however, the adjusted earnings showed that the three Asian groups appeared to have suffered a substantial amount of earnings discrimination in 1960. From 1960 to 1970, the difference between actual and simulated earnings was narrowed rapidly. In 1980, actual earnings were greater than simulated earnings based on the estimates for white women. And by 1990, Asian women lost much of the earnings advantage. The author speculated that the fluctuations in the 1980s and 1990s might be due to measurement problems as opposed to differences in discrimination over time.

Duleep and Sanders' (1992) analysis based on 1980 census data also offered

some preliminary evidence of discrimination for professional workers of Asian origin. They regressed the natural log of annual or hourly earnings for each group on a set of explanatory variables including education, potential work experience, English proficiency, whether disabled, marital status, region (dummy California and Hawaii) and urban residence. The regression results showed that Asian men earned as much as non-Hispanic white men. But after adjusting for occupation and industry, Asian men in all five selected groups (Chinese, Japanese, Indian, Korean, Filipinos) earned less than their white counterparts at higher levels of education; Chinese, Japanese, and Korean men tended to earn more than comparable whites at low levels of schooling.

However, also based on census data, other studies reached conflicting conclusions. Using the micro data samples from the 1960, 1970, and 1980 censuses, the U.S. Commission on Civil Rights (1988) assessed how well Asians as individual men and women fared in the U.S. labor market compared with non-Hispanic whites. The report found that Asian women, both native born and immigrants, earned as much as non-Hispanic white women with comparable characteristics. The report concluded that there was no evidence of discrimination against Asian women in the labor market. The report also indicated that Chinese males earned annually slightly less than their non-Hispanic counterparts after adjusting for differences in education, labor market experience, region of residence, urban location and other productivity-related characteristics. At the hourly level, Chinese men earned as much as their white counterparts. Therefore, the report concluded that no evidence of discrimination against the Chinese men was found.

Chiswick's (1983) study based on 1970 Census data also supported the no-discrimination thesis. He found that both Chinese and Japanese men born in the United States had more education and earnings than white men. Controlling for human capital, demographic, and geographic area variables, no difference in earnings was found between Chinese and white men; only the weekly earnings of Japanese men were slightly lower than those of white men with similar characteristics. His findings suggested that American-born Chinese and Japanese have been as successful as native whites in the U.S. labor market. He concluded that "it is incorrect to assume that racial minority status in the United States and racial discrimination per se result in lower observed levels of earnings, schooling, employment, and rates of return from schooling. More care may be needed in attributing to racial discrimination the disadvantageous outcomes for other, less successful racial and ethnic minorities" (Chiswick 1983:212).

Using 1970, 1980 and 1990 census data on working age women of age 25-60, Schoeni (1998) also found that immigrants from Japan, China, and Korea (these three sending countries were grouped together to obtain a large enough sample size to conduct a meaningful analysis) had steady or improved wages relative to U.S.-born women. Tang (1993) also found that Asian women had a slight economic advantage over white females with comparable background skills in many fields of science and professions. She concluded with caution that discrimination may not be so pervasive as to systematically hamper Asian American economic achievement.

Based on 1990 census data, Iceland (1999) examined systematically by Asian ethnicity and gender whether Asian Americans received lower earnings returns to their

occupational status than non-Hispanic whites. His multivariate results indicated that native-born Asian men and women of various ethnic groups did not earn significantly less than comparable native-born non-Hispanic whites. Based on this evidence, he concluded that there was no racial discrimination against native-born Asian men and women in the labor market. Only foreign-born Asian men were disadvantaged relative to native-born non-Hispanic white men, although within this group there was considerable variation by nation of origin.

Finally, Zeng and Xie (2004) argued that Asian Americans earned less than their white counterparts because the education of many immigrants obtained in their home countries was less valued in the U.S. job market than that obtained in the host country. Based on 1990 PUMS data and data from the 1993 National Survey of College Graduate, they showed that place of education played a crucial role in determining earnings attainment of Asian Americans, while race and nativity per se did not have any significant impact on earnings. Since a large proportion of Chinese immigrants have completed their education outside the United States, past studies that have found an earnings disadvantage associated with being either Chinese American or Chinese immigrant may have picked up the effect of place of education, instead of ethnicity, as Wong (1982) claimed.

Summary

As a major individualistic research tradition, the human capital model stresses the importance of human investments in accounting for earnings attainment in the labor market. As indicated in Chapter II, Chinese Americans have been “heavy investors” in

such human capital as educational attainment. However, empirical studies regarding the returns to their investment in human capital have been marked by a lack of consensus, even though they are mostly based on the same data sources. Specifically, some studies show that compared with majority whites, Chinese Americans have an equitable conversion of educational attainment into earnings in the labor market (Chiswick 1983; Nee and Sanders 1985). Other studies suggest that Chinese Americans must achieve higher levels of education before they can obtain comparable earnings with majority whites (Hirschman and Wong 1984). That is to say, the educational advantages of Chinese Americans do not necessarily imply economic advantages as conventionally assumed. Wong (1980) attributed the failure among Chinese to convert their high educational achievement into earnings as efficiently as their white counterparts to the cost of ethnicity. However, Sakamoto and Furuichi (2002) did not think so. Their multivariate results lend support to Wilson's (1980) thesis of the declining significance of race. That is, class characteristics, in particular educational attainment, have become a more important role than racial status per se in determining wages in the labor market. This conclusion receives partial support from Zeng and Xie (2004) who found that the place of education plays a crucial role in determining Asian Americans' earnings, while race and nativity per se do not have any significant impact on Asian Americans' earnings. Zeng and Xie's study may help explain why previous studies have tended to find an earnings disadvantage associated with being either Chinese American or Chinese immigrant. Because a large proportion of Chinese are immigrants who have obtained

their education outside the United States, their relatively lower returns to human capital may have picked up the effect of place of education, rather than ethnicity.

Labor market experience, another major component of the human capital model, is generally found to be positively associated with the earnings attainment of Chinese workers in the few empirical studies based on the census data. A decaying effect among older age groups is also found in some studies.

As an extended form of human capital model, the assimilation model incorporates into the standard Mincer equation some typical immigrant variables such as nativity, duration of stay in the destination country, and language proficiency. Like immigrants from other parts of the world, Chinese immigrants also have their strengths and disadvantages associated with the process of adjusting and adapting to the host society. General empirical research finds that Chinese immigrants often earn less than their native counterparts and majority whites. This is because the barriers or disadvantages the immigrants encounter outweigh their inherent strengths in adjusting to the labor market in the host country. However, the assimilationist predicts, sufficient length of stay in the host country should not only diminish cultural and socioeconomic differences between natives and immigrants but also promote their overall integration into the mainstream society. Empirical research based on census data finds that the initial lower earnings of Chinese immigrant workers typically rise with duration and accumulation of labor market experience in the host country. In adjusting to the labor market, both education and good command of English language are found to contribute to the earnings attainment of Chinese immigrants.

If the investments in human capital and assimilation efforts in general play positive roles in the socioeconomic mobility of minority workers and immigrants, racial discrimination in the labor market tends to hamper their efforts in this regard. Discrimination results from competing for limited resources and space. Although it may hurt firms or employers (Becker 1971), racial discrimination hits the minority members the hardest, because it reduces the range and quality of economic opportunities available to them, thereby constraining their socioeconomic mobility.

However, empirical studies based on census data reached somewhat conflicting conclusions. Some studies tend to show that Chinese Americans pay a cost for their group membership. Other studies, also based on the same data sources, do not find Chinese workers earn significantly less than white with comparable characteristics, and thus proceed to conclude that no evidence of racial discrimination against the Chinese workers was found. Because of the measurement difficulty, empirical studies typically attribute racial discrimination to the unexplained differences between racial and ethnic groups in the earnings determination models. Consequently, the presence or absence of "evidence" of discrimination depends largely on the measurement of variables. For example, instead of assuming the universal exchange value of education, Zeng and Xie's (2004) distinguished between formal educations obtained in and outside the United States. They found that Asian Americans earned less than their white counterparts because the education of many immigrants obtained in their home countries was less valued in the U.S. job market than that obtained in the U.S. That is to say, place of education played a crucial role in determining earnings attainment of Asian Americans,

while race and nativity per se did not have any significant impact on earnings. Most likely, studies that have found Chinese Americans or immigrants at an earnings disadvantage may have picked up the effect of place of education, because a high proportion of Chinese immigrants had completed their education before they migrated to the United States.

The presence or absence of "evidence" of discrimination may also have resulted from model specification. In reality, specification problem is not unique to the discrimination model. As indicated in the above review, much of the writing on individual earnings has tended to overemphasize the importance of individual characteristics and ignore the roles of structural or contextual factors. Consequently, structural or contextual factors are seldom included in their models. However, as will be indicated in the following chapter, contextual factors may also impact the economic outcomes of individual at varying degree.

CHAPTER IV

CONTEXTUAL CHARACTERISTICS AND EARNINGS

Chapter III reviewed the research tradition that typically deals with the economic outcomes at the individual level. To obtain a complete picture, this chapter looks at the other research tradition, namely, the macro approach that relates individual earnings to contextual factors. Although there are numerous contextual factors that may affect the earnings attainment of individual workers, this chapter focuses on four of them: racial proportion in the labor market (i.e., relative size of a minority population), occupational distribution of minority workers, residential segregation, ethnic economy, and their respective effects on earnings of the general population in the United States. Other factors are also mentioned in passing. Because these factors are closely related to one another, sometimes it is not easy to disentangle the relationships among them. Population, which always serves as the reference point and the basis for all discussions, is the starting point of the review.

Relative Size of Minority Population

The association between the relative size of a minority population in an ecological locality and its socioeconomic outcomes has been studied extensively in sociology for decades. Indeed, "…the analysis of the socioeconomic inequality operationalized in terms of differentials between majority and minority populations in levels of occupation and income, has long been central to the study of race and ethnic

relations" (Frisbie and Neidert 1977:1007). The bulk of the scholarship in this field has reflected the dominant racial structure as a dichotomy of blacks and whites in the United States. Earnings-discrimination and economic structure are two of the major features of theories about the relative size of a minority population and the economic outcomes of the minority group in an ecological locality.

The discrimination thesis offered in the sociological literature is sociopsychological in nature and was originally advanced by Williams (1947). The basic idea is that an increase in the relative size of a minority population intensifies the majority group's fear of competition over jobs and resources, and thus results in their prejudice and hostility toward the minority group and their motivation to discriminate against them in the labor market. Blalock (1967:183) further pointed out that "Provided that minority competition underlies prejudice, there should be a positive relationship between minority percentage and discrimination." When they stand to gain security and profit from discrimination, the majority group seems to have a strong need and desire to discriminate against an expanding racial minority (Allport 1954; Blalock 1967; Williams 1947; Glenn 1963). By relegating minority members to low-level or undesirable jobs for less pay, white employers can not only prevent competition over limited resources but also profit more. A vicious circle is thus formed. The higher representation of minorities in the labor market, the more incentives for whites to engage in discrimination for greater potential gains.

Like sociologists, economists also hypothesize for a positive association between the relative size of a minority group and the level of economic inequality. In the case of

blacks, Becker (1971) suggested that some employers' prejudice against blacks leads to their discrimination against them in the labor market. When the black population is relatively small in a community, they all often may land a job with nondiscriminatory employers. However, as the number of the black population increases, not all blacks can find jobs with employers harboring no discrimination or prejudice. As a result of having to work for discrimination-minded employers, discrimination levels may increase with the expanding black population in the labor market.

The second major explanation for the negative effect of minority representation on their members' earnings focuses on the variation in the economic structure of local labor markets. When a local market has to rely on a few industries, and has a less diverse occupational structure, the increasing minority representation tends to lower their earnings because they will be channeled to a narrower range of low-status, low-paying jobs (Spilerman and Miller 1977; Cassirer 1996). That is to say, whenever a minority fills the low-status occupations, the majority can abandon the less-desired jobs and concentrate in disproportionate numbers in high-status, lucrative occupations (Glenn 1962). Empirical studies find that black representation is associated with lower earnings for black men in the South which was characterized by reliance on agriculture and slow industrialization (Glenn 1966). In the North, there were more manufacturing industries that offered black entry-level jobs (Jones 1992). It is assumed that availability of the relatively well-paying manufacturing occupations in the north helped blacks eschew the negative effects they experienced in the South.

The earnings-discrimination and economic-structure explanations are not

mutually exclusive; each may shed light on the association between earnings and minority representation in an ecological locality.

Empirical study on the relationship between minority and majority in an ecological unit has traditionally centered on black and white workers and has often concluded that the majority's prejudice and discrimination against a racial or ethnic minority vary directly with the relative size of the minority population (Allport 1954). In the labor market, the socioeconomic status of a minority population is largely determined by the extent and magnitude of discrimination the dominant group poses against it in accordance with the minority's relative size. Using census data from 1940 to 1990 and different theoretical perspectives, most of the research that focuses on different types of communities utilizing a variety of differentiation measures has found that socioeconomic inequality varies directly with the relative size of a minority in an ecological locality: majority whites tend to earn more on average in a locality with greater black representation, and blacks earn less (Glenn 1963, 1964; Martin and Poston 1972; Frisbie and Neidert 1977; Semyonov , Hoyt, and Scott 1984; Semyonov, Haberfeld, Cohen, and Lewin-Espstein 2000; Tienda and Lii 1987; Hirsch and Schumacher 1992; Cassirer 1996; Semyonov and Herring 2003); only a few studies fail to find any direct relationship between minority percentage and occupational differentiation (e.g., Blalock 1956, 1957; Jiobu and Marshall 1971).

However, the increasing size of a minority population does not always lead to adverse economic outcomes for group members. That is, the association between a group's relative size in a locality and the socioeconomic inequality is not necessarily

linear. When the proportionate size of the minority is large enough, there may be some overflow of minority workers from lower to higher status occupations when virtually all lower-level or undesirable occupations are already filled by the minority and/or when a not sufficient number of majority workers are available to occupy all upper-status positions (Frisbie and Neidert 1977). Also, when the minority population is large, there may be more opportunities for minority businesses where minority professionals and other classes of workers may be employed (Glenn 1964). For example, some empirical studies find that the greater the black representation in a community, the more both black and white men will "overflow" into higher status jobs (e.g., Blalock 1957; Glenn 1964; Semyonov et al. 1984). Poston and Jia's (1989) analysis based primarily on data from the 1980 Public Use Microdata Samples suggested that among female immigrant groups, the less dispersed geographically their population, the higher their average earnings. Yamanaka and McClelland (1994) also found that the concentration of minority population in a location was not necessarily detrimental to their economic productivity: labor markets in areas where Asians were concentrated offered them differentiated opportunities unavailable elsewhere. Mar's (2000) analysis showed that areas with either a high percentage of populations of Asian Americans or a very low percentage appeared to have little discrimination against Asian American workers.

Some studies suggest that it is important to take into account the racial mix of the locality in a multiracial setting. For example, Wilson (1996) noted that employers might prefer to hire Hispanics to blacks in the job market. Frisbie and Neidert (1977) found that Mexican Americans benefited from the presence of a sizable population of blacks in

the labor market, but the proportion of Mexican Americans in the community had little or no effect on the relative occupational status of blacks. Tienda and Lii (1987) investigated the effects of education and racial/ethnic composition of labor markets on earnings inequality among African, Hispanic Americans, Asian Americans, and Non-Hispanic white males. They found that Asian males experienced the greatest income losses from labor markets with a large share of minority members, while white males experienced the lowest income losses. They also found that non-white males with college education suffered the greatest losses in earnings from labor markets with high minority concentration, while college-educated white males gained most from it.

Occupational Segregation

Occupation not only determines levels of pecuniary compensation but also helps to define networks of acquaintances for future advancement. As such, access to a full range of occupations in a labor market is a critical resource necessary for socioeconomic success (Burr, Potter, Galle, and Fossett 1992). However, occupational segregation occurs when there are differential distributions by gender or by race and ethnicity across occupations, jobs, and places of work (Padavic and Reskin 2002). High occupational segregation from the majority tends to reduce the range and quality of economic opportunities available to minority group members, thus widening their earnings gap. Indeed, some studies suggest that occupational differentiation, rather than education or experience, is the driving force behind the racial and sexual differentials in earnings attainment (King 1992). Empirical studies have showed that between 8-43 percent of the

wage gap is associated with occupational segregation by gender (England 1992; Sorensen 1990). Treimann and Hartmann's (1981) analysis of 1970 census data indicated that occupational differences alone accounted for between 35 and 40 percent of the wage gap between men and women. That is to say, at least 35 percent of the gender gap in earnings would be eliminated if women had the same occupational distribution as men but retained their average earnings within occupations. Based on 1980 and 1990 census data, Cotter, Defiore, Hermsen, Kowalewski, and Vanneman's (1995) cross-sectional decomposition results indicated that 15 percent of the earnings gap between men and women would be eliminated if women and men had the same patterns of occupation distribution; their over-time decomposition results showed that a decrease in occupational segregation accounted for about 36 percent of the decline in the earnings gap; most of the declining earnings gap resulted from equal pay within occupations.

Although social scientists have viewed segregation in the labor market as one of the most effective mechanisms through which ethnic minorities are denied access to economic rewards, relatively few studies have examined the relationship between occupational segregation and earnings inequality separately by race/ethnicity (Cotter, Hermsen, and Vanneman 2003). Generally speaking, the level of occupational segregation for a minority group represents the variation in opportunity for their economic success. Labor market segregation acts as a major determinant of ethnic inequality. The minority group members earn less than the majority members in part because they are segregated in lower-paying or less desirable jobs. Zalokar (1990, cited in King 1992) has shown that approximately half of the historical earnings difference

between black and white women has been attributable to differential allocations among occupations and industries. Semyonov and Herring (2003) concluded from their analysis that job segregation was fully responsible for earnings disparities between blacks and whites, but only partially so for disparities between Hispanics and whites.

Cotter and colleagues (2003) investigated the effects of occupational segregation on earnings across four racial/ethnic groups for both men and women workers. They found that segregation affected earnings by lowering the earnings of workers in female-dominated occupations and by lowering the earnings of all workers in highly segregated labor markets.

Analyses of the relationship between occupational segregation and earnings inequality concerning Asian or Chinese Americans are few, either because these "model minority" groups were taken as having no segregation problems, or because their relatively small population size did not permit the calculation of aggregate indexes in appropriate ecological units. However, the few existing studies show that occupational segregation affects the economic outcomes of Asian Americans more than any other group. According to the U.S. Commission on Civil Rights (1978), Asian American women were the most occupationally segregated of all groups (males and females) with the least chances of improving their situation through mobility up the job ladder. Woo (1985) found that in 1976, 80 percent of Chinese American and Filipino American women would have to change their jobs in order to approximate the distribution held by majority males. Her study showed that since 1960, the trend toward segregation has increased for Asian American women.

Based on 1980 census data for the San Francisco Bay Area, Cabezas and Kawaguchi (1988) showed a concentration of Asian Americans in low-tiered occupations in the primary sector and a clustering in the secondary sector. The labor market segmentation was seen as the more likely origin of the observed inequality in earnings. Their study strongly suggested that race and economic class placement in segmented markets were important for Asian Americans—both men and women. Their findings support Nee and Sanders' (1985) observations that the labor market and occupational concentrations of Asian Americans may be important in determining their earnings.

Residence and Earnings Opportunity

In this dissertation, residence refers to two aspects of the physical distribution of the Chinese population in the United States. One aspect is their geographical distribution by region or state, and the other is their distribution in smaller communities, such as census tracts in a metropolitan area.

Historically, the majority of Chinese Americans have tended to reside in just a few states in the United States; within a state or city, they again tend to be heavily congregated in or close to Chinatowns (Jiobu 1976). This pattern of residence remained much the same in the 1990s (Frey and Farley 1996) and continued towards the end of the 20th century. Specifically, Chinese are most likely to reside in some of the more affluent states of the country like California, New York, New Jersey, and Texas (U.S. Bureau of Census 2001b). In these states, they concentrate in metropolitan areas such as San

Francisco, Los Angeles, New York City, and Houston, among others. Research finds that these areas, characterized by a high concentration of ethnic business establishments, tend to offer better employment opportunities and better positions for Asian Americans than do other areas where the majority whites live (Wong and Hirschman1983; Yamanaka and McClelland 1994). Residence in these areas is also found to be associated with higher earnings. For example, Wong and Hirschman's (1983) analysis using 1970 census data attributed Asian American (Chinese, Japanese and Filipino) women's above average earnings relative to white women to both their superior educational qualifications as well as their residence in California, New York, and Hawaii, and in metropolitan areas where occupational opportunity was ample. Also using 1970 Census data, Chiswick's (1983) study showed that living in Hawaii, rather than in urban California, was associated with higher earnings for Asian-origin men, particularly the Chinese and Japanese, but was associated with marginally significantly lower earnings for whites. The U.S. Commission on Civil Rights (1988) also found that American-born Chinese men, three quarters of whom lived in the West, earned as much as white men in California and more than whites in Hawaii. Yet, these statistics also showed that American-born Chinese men earned 17 percent less than non-Hispanic whites in the East.

As shown above, the Chinese population is heavily concentrated in a few states and empirical studies on their earnings attainment have tended to take residence into consideration. However, relatively few have looked at the potential effects of residential segregation on individual earnings in a community.

Residential segregation refers to the physical separation of population subgroups in residential space. Both Hawley (1944) and Park (1950) held that the degree of physical separation between two groups is closely associated with the nature of social relations between them; moreover, physical distances are frequently the indexes of social distance. Empirical study finds a close relationship between spatial and social distances (e.g., Duncan and Duncan 1955a).

A number of factors contribute to racial and ethnic residential segregation in a community. For example, Burgess (1925) and Park (1926) asserted that differences in the degree of residential segregation between groups are a result of differences in socioeconomic variables such as income, education, and occupations. Apart from socioeconomic differences, varying housing costs across neighborhoods produce some segregation between groups (Pascal 1967). Massey and Denton (1993) further argued that discrimination in the real estate and housing financing institutions contributes to the segregation. Others believe that some racial/ethnic groups simply prefer to live in neighborhoods of their own people; or conversely, they just want to avoid a particular group or groups (Clark 1986, 1992; Farley 1977).

Residential segregation, whether voluntary or involuntary, has clear consequences for the affected minority group(s). It may provide the basic structure for other forms of institutional segregation (Johnson 1943), increase unemployment rates (Kain 1968), minimize the interaction with different groups, severely limit opportunities for economic mobility (Hirschman 1983; Wilson 1987), and work to perpetuate minority status (Hawley 1944) and their social distance from the majority (Massey,

Condran, and Denton 1987), just to name a few. Residential segregation is also a major hindrance to progress in other aspects of ethnic assimilation (Duncan and Lierberson 1959; Lieberson 1961; Marston and Van Valey 1979). However, socioeconomic advancement by racial and ethnic minorities should eventually lead to their progressive assimilation (Burgess 1925; Park 1926), though the hypotheses have been discredited in a number of studies (e.g., Taueber and Tauerber 1965; Farley 1977).

Over the past 150 years, residential segregation from the majority whites has been a "norm" for the Chinese in the United States. However, most research on residential segregation has focused on blacks and whites (e.g., Duncan and Duncan 1955a). It was not till the 1980s that studies of the residential patterns of Asians/Chinese appeared (e.g., Lam 1986; Massey and Denton 1987, 1992; Denton and Massey 1988; Alba and Logan 1993; Freeman 2000; Frey and Farley 1996). However, because of their relative small size, most of the time the indexes are constructed for all Asians and Pacific Islanders lumped together.

Empirical studies show that compared to other major minority groups, Asians have experienced relatively low levels of segregation from whites and moved towards incorporation with the mainstream society. For example, Massey and Denton (1987) found that the level of Asian segregation from the majority whites in 1980 was close to that of the old European ethnic groups in 1970. Frey and Farley's (1996) study also indicated that as a "buffer" between blacks and whites, Asians appeared to have lower levels of segregation than blacks in both metropolitan and suburban areas. Other studies found the Chinese at low to moderate levels of segregation from the majority whites

(Langberg and Farley 1985, 1988; Massey and Denton 1992). Lam's (1986) analysis of 822 suburban units in 212 metropolitan areas suggested that the segregation between Chinese and whites from has declined from 1960 to 1980.

As mentioned previously, segregation has been viewed as a contributor to minority poverty, because minorities are denied access to occupations in the larger society. Generally, residential segregation in a community affects an individual's economic outcomes in two ways: one is to limit individual access to information regarding employment opportunities in a larger society, and the other is the lack of the means of transportation to the worksites even if they have secured jobs, since the modern worksites are typically suburbanized and minority groups such as Chinese tend to reside in downtown areas. As a result, residential segregation is often found to be associated with poverty. For example, Massey (1990) found that racial segregation plays a crucial role in concentrating poverty and creating an underclass in the 1970s. Santiago and Wilder (1991) reported that residence in the more segregated metropolitan areas was a significant predictor of Latino poverty.

Chinatowns are a special case of residential segregation from not only the majority whites but also other racial/ethnic groups in the larger society. The effect of its isolation from the outside world on the socioeconomic mobility of the residents is controversial. For example, based on the national data from the 1960, 1970 and 1976 censuses, Hirschman and Wong (1984) found that compared with other Asian groups like Japanese and the Filipinos, Chinese men experienced the greatest net direct handicap in earnings. They suspected that one of the major reasons was the maintenance

of Chinese ghettos (Chinatowns) in many large cities. Although the enclave provides many essential services for the largely immigrant population, it may also provide a funnel that directs many Chinese Americans into lower-paying jobs. And the lack of similar residential concentrations of most Japanese and Filipinos may be an important reason for the diminishing direct effect of their ethnicity on earnings.

Hirschman and Wong's (1984) did not have data to support their speculation. However, some empirical studies based on regional data seem to lend some support for their suspicion. For example, Zhou and Logan (1991) looked at the residential patterns of Chinese residents in and around New York City and found that dissimilarity indexes ranging from 0.545 to 0.838, indicating that Chinese are fairly highly segregated from other racial and ethnic groups. Their field interviews suggested that Chinese segregation is a result of voluntary choices related to the enclave economy. However, the Chinese pay a price, because the wages in the enclave industries are low, and the housing prices are high. However, in another study of the Chinese in New York City, Zhou (2000) claimed that Chinatown does not necessarily block immigrants from moving up on the socioeconomic ladder in the larger society. She considered the low-paying menial jobs in the enclave as "part of a time-honored path toward upward social mobility among Chinese immigrants. Since Chinatown has a structural duality –with a protected sector serving mostly Asian customers and an 'export sector' selling goods and services to people outside the enclave—it can actually facilitate the entry of immigrants into the larger society" (2000:220-222). The following section will deal with more of ethnic business and its effect on earnings.

Ethnic Economy and Earnings

The study of initial status attainment in the United States has moved from inquiry into family backgrounds (Duncan and Hodge 1963; Blau and Duncan 1967; Featherman and Hauser 1978) to detailed examinations of the attainment processes (Sewell and Hauser 1975), to the dual economy, or dual labor market/market segmentation (Bluestone, Murphy, and Stevenson 1973; Stolzenberg 1975; Beck, Horan, and Tolbert 1978, 1980; Tolbert, Horan, and Beck 1980; Hodson 1978).

The dual economy offers a structural explanation for economic inequality between racial and gender groups. This approach divides the industrial structure into two distinct sectors: core (or primary) and periphery (or secondary). According to Bluestone, Murphy, and Stevenson (1973), the firms in the core sectors are characterized by high productivity, high profits, intensive utilization of capital, high monopoly, and substantial protection from external competition. Workers in these industries generally enjoy relatively high wages. Periphery industries are those beyond the fringes of the core economy and are characterized by small firm size, easy entry, labor intensity, low productivity, low profit, low job security, and low wages, and few chances for upward mobility. The theory suggests that racial group differences in economic outcomes result largely from differential assignments of group members in the sectoral structure of the economic order.

Some scholars have treated immigrant enclave economy as a third sector that is distinct from both the primary and secondary labor markets (Wilson and Portes 1980; Portes and Bach 1985). Although characterized by low-wage jobs similar to those in the

secondary economy, these ethnically controlled avenues may provide workers with benefits that not available to them otherwise.

Self-employment, an important form of ethnic economy [4], has long been recognized as an important vehicle for social survival and upward mobility among immigrants in North America (Park 1936; Borjas 1986; Cummings 1980; Light 1972; Maxim 1992). A myriad of theories have been proposed to explain a minority group or immigrant's propensity for self-employment or the existence of enclave/ethnic economy. Cultural theory, middleman minority, disadvantage theory, and opportunity structure are the selected perspectives presented below.

Cultural theory posits that some cultural elements inherent in a group predispose its members to engage in entrepreneurial activities (Light 1980). The cultural values of Asians, which are said to be in effect similar to the Protestant ethnic values held by the white middle class, are decisive in explaining the socioeconomic gains of Asian Americans (Kitano 1976; Schwarts 1971). However, such cultural explanations have been criticized by sociologists who are more sensitive to historical and structural explanations of socioeconomic mobility (Lieberson 1980).

Based on the successful story of overseas Chinese in Southeast Asia, Bonacich (1973) developed Blalock's (1967) concept of the middleman minority by arguing that

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[4] According to Logan, et al.(1994), an ethnic economy is bounded by race, ethnicity, or national origin. And as a specific type of ethnic economy, enclave economy rests fundamentally on co-ethnicity of owners and their employees while concentrating in a metropolitan area and specializing in certain sector. Since most studies rely on census data that provide no information on the racial/ethnic ownership and workforce composition of firms, a more general term "ethnic economy" is used in this dissertation.

some minority groups are often constrained to occupy an intermediate position and concentrate in certain occupations (e.g., trade, agents, labor contractor, and broker) and play the role of middlemen between producer and consumer, employer and employee, and the elite and the mass. Bonacich emphasized the use of kinship ties to build an ethnic economy that both serves the ethnic minority and competes effectively with firms in the mainstream economy. However, critics contend that this theory may be useful for explaining the over-representation of immigrants among entrepreneurs, but it does not explain inter-group differences in business ownership. For example, Wong (1985) criticized the middleman hypothesis as a cultural explanation and challenged its credibility and validity in the specific cases of Chinese and Japanese in the United States.

Disadvantage theory describes self-employment as a survival strategy that minorities or immigrants use when they are disadvantaged in the mainstream labor market because of poor English ability, non-transferable credentials or skills acquired outside the host country, limited educational attainment, limited employment opportunities, labor market discrimination, and so forth (Light 1972, 1980). Small business ownership often allows disadvantaged people to earn more than they might otherwise receive in formal wages, and to capitalize on family resources such as unpaid family labor.

The opportunity structure perspective takes into account such structural factors on self-employment participation as market conditions, group size, and discrimination (Aldrich and Waldinger 1990; Aldrich, Cater, Jones, McEVoy, and Velleman 1985;

Light 1972). Many ethnic entrepreneurs take advantage of their knowledge of the tastes, preferences, and language of their ethnic groups and form a protected market niche (Light 1972). Because of limited access to the primary market, investors tend to invest in the ethnic community to take advantage of cheap ethnic labor. For ethnic workers or immigrants, the community labor market serves as an alternative to the outside job market. Although they may be paid with less and work longer hours, they can at least transfer their human capital without much language difficulty.

Portes and Bach (1985) emphasized the crucial role that the ethnic economy plays in the mobility and status attainment processes of ethnic group members in the United States. Indeed, being excluded from the larger labor market by restrictive legislation and racial discrimination, Chinese immigrants had no alternative but to take the route of self-employment for economic advancement in the United States (Lyman 1974; Chow 1996). Typically, the self-employed businesses of Chinese are small and ethnic-oriented and based in Chinatowns so that they can take advantage of the labor supply and patronage of minority and immigrants (Chow 1996; Li 1977). Without doubt, self-employment may provide an alternative economic channel for both the owner and the employees. However, given the employment opportunities offered to minorities or immigrants, there is still controversy regarding the effect of self-employment on the economic mobility of individual workers. Some studies have found that the success of Chinese immigrants is to a large extent due to their ownership of small businesses (Light 1972). For example, Nee and Sanders (1985) suggested the importance of small business ownership for providing Asian Americans with an ethnically controlled avenue of

economic mobility. They found that self-employed Chinese clearly enjoyed higher earnings than workers in the private and public sectors. The existence of an ethnic economy supports a middle-class based in the ownership of small businesses for immigrants/minority groups. Similarly, Cabezas and Kawaguchi (1988) found that self-employment raised the incomes of foreign-born Chinese, Filipino, and Korean men in California.

Although ethnic businesses may provide an alternative channel for socioeconomic mobility as well as resources for immigrant workers that parallel human capital (Portes and Bach 1985; Hurh and Kim 1984), others have found that they can also have negative effects on the employees. For example, Hirschman and Wong (1984) speculated that the lower earnings of Chinese workers compared to other Asian groups might have resulted from working in the enclave economy in the Chinese ghettos in many large cities. Working in Chinatowns was found to be associated with lower earnings (Zhou and Logan 1991), though the possibility of moving upwards on the socioeconomic ladder still existed (Zhou 2000).

In addition to the relative size of minority group, social capital implied in ethnic economy, minority-majority segregations in occupations and residence reviewed above, many other structural or contextual factors may affect the earnings attainment of individuals. For example, Tienda (1983) showed that high unemployment rates had extraordinarily strong negative impacts on the annual earnings of Hispanics; employment in areas with favorable wage structures presumably afforded workers better opportunities to achieve higher earnings. Poston and Jia (1989) found that other

opportunity structures such as the cultural factor expressed as "decades since the population exceeded 50,000" and the geographical concentration of a minority population may have impact on the economic fate of the immigrant workers. Using 1990 census data, Poston (2002) examined the extent to which the human capital characteristics of the Asian immigrants as well as the contextual or cultural capital characteristics of their country-group influence their levels of economic attainment. His multilevel analysis indicated that educational attainment at both the micro and macro levels was an important predictor of earnings achievement; the two cultural capital or contextual variables--mean years of schooling of each ethnic group and the percent naturalized population serving as proxies for various kinds of opportunity structures, did not show evidence of statistically significant effects on earnings of Asian-born immigrants in the United States. The result confirms Portes and Bach's (1985) claim that the receiving social context may decisively affect the collective fates of immigrants in the U.S. In sum, accumulating findings evidence the importance of contextual factors in determining individual earnings.

Summary

This chapter focuses on four major structural factors--relative size of minority population, occupational segregation, residential segregation, and ethnic economy--and their impacts on the earnings attainment of minority workers. The relative size of a minority population is the reference point for other discussions. Two major perspectives--Earnings-discrimination and economic structure—are presented to account for the

association between the relative size of a minority population in an ecological locality and its socioeconomic outcomes. Earnings-discrimination perspective proposes a positive relationship between the relative size of a minority group and discrimination: an expanding minority population intensifies the majority group's fear of competition over jobs and limited resources, thus resulting in their prejudice and hostility toward the minority group and their motivation to discriminate against the minority workers in the labor market. Economic structure perspective focuses on the variation in the industrial structure of local labor markets in explaining the negative effect of minority representation on their members' earnings: when a labor market is less diversified in economic structure, the increasing representation of a minority group would tend to hamper the economic outcomes of the group members.

Empirical study using census data from 1940 to 1990 has found that socioeconomic inequality varies directly with the relative size of a minority in an ecological locality: majority whites tend to earn more on average in a locality with greater minority representation, and minority earn less. However, some scholars also argue that an increasing minority population does not necessarily lead to adverse economic outcomes for group members, because 1) an increasing minority may cause some overflow from lower to higher status occupations when virtually all lower-paying or undesirable occupations are already filled by the minority and/or when no majority workers are available to occupy all upper-status positions (Frisbie and Neidert 1977), and 2) a larger minority population may create more opportunities for minority businesses where minority professionals and other classes of workers may be employed.

Empirical studies do find that concentration of minority population in a location is not necessarily detrimental to their economic productivity (Poston and Jia 1989; Yamanaka and McClelland 1994; Mar 2000).

Traditional study on minority-majority relation tends to focus on the dyad of blacks and whites. With the influxes of immigrants from Latin America and Asia in the past decades, some studies begin to pay attention to the effect of racial composition on individual economic outcomes in a multiracial setting. Empirical studies show that the racial composition of a locality affects each minority group differently (Frisbie and Neidert 1977; Tienda and Lii 1987; Wilson 1996).

As mentioned above, an increasing minority population may function to redistribute its members among occupations. Because access to a full range of occupations in a labor market is a critical resource necessary for socioeconomic success, high occupational segregation from the majority tends to reduce the range and quality of economic opportunities available to minority group members, thus widening their earnings gap. Empirical studies, the bulk of which is based on black and white populations, suggest that occupational differentiation between men and women or between minority and majority, rather than education or experience, is the driving force behind the sexual and racial differentials in earnings attainment (King 1992; Cotter, Hermsen, and Vanneman 2003; Zalokar 1990; Semyonov and Herring 2003). The research concerning Asian or Chinese Americans is relatively scant. The few studies show that occupational segregation affects the economic outcomes of Asian Americans

more than any other group (The U.S. Commission on Civil Rights 1978; Cabezas and Kawaguchi 1988).

While it is generally believed that occupational segregation represents a constraint of economic opportunity for a minority group, residential segregation may not necessarily work the same way for Chinese. The majority of Chinese population in the United States tend to separate themselves residentially from the majority whites in two ways: they are concentrated heavily in a few states; and in these few states, they tend to be congregated in or close to the Chinatowns in a few metropolitan areas. Research finds that these states, characterized by a high concentration of ethnic business establishments as well as high living costs, are found to be associated with higher earnings because they tend to offer better employment opportunities and better positions for Asian Americans than do other areas where the majority whites frequently live (Wong and Hirschman 1983; Yamanaka and McClelland 1994; Wong and Hirschman 1983; Chiswick 1983; The U.S. Commission on Civil Rights 1988).

Although it is often found that residential segregation in a community affects adversely a minority worker's economic outcomes, the effects of Chinatowns, a special case of residential segregation, are controversial. Some speculate that they incur direct handicap in earnings among the residents (Hirschman and Wong 1984). Others hold that this voluntary segregation in Chinatowns pays a price (Zhou and Logan 1991), but does not necessarily block the residents from moving up on the socioeconomic ladder in the larger society, because its structural duality–a protected sector serving mostly Asian customers and an "export sector" selling goods and services to people outside the

enclave—can actually facilitate the entry of it its residents into the larger society (Zhou 2000).

Residential segregation is closely related to ethnic economy. In effect, some attribute the establishment of ethnic economy to the geographical concentration of a minority group (e.g., Logan, Alba, and McNulty 1994; Wilson 2003). As a complementary explanation to the dual economy, ethnic economy offers an alternative avenue for economic mobility among minority members outside the mainstream labor market. Although characterized by low-wage jobs similar to those in the secondary economy, this avenue plays a crucial role in the mobility and status attainment processes of ethnic group members in the United States. Cultural theory, middleman minority, disadvantage theory, and opportunity structure, are some of the major explanations of the emergence and/or overrepresentation of ethnic business, though not without disputes about their applicability to some specific groups.

Typically, the Chinese-owned businesses are small, ethnic-oriented, and based in Chinatowns so that they can take advantage of the labor supply and patronage of co-ethnics (Chow 1996; Li 1977). However, the effect of the ethnic businesses on the economic mobility of individual workers remains controversial. Some studies attribute the success of Chinese immigrants to their ownership of small businesses (Light 1972; Nee and Sanders 1985; Cabezas and Kawaguchi 1988); others have found that ethnic economy may have negative effects on the employees (Hirschman and Wong 1984; Zhou and Logan 1991), though there is still possibility for them to move upwards on the socioeconomic ladder (Zhou 1992).

To conclude, the review of macro or structural approaches suggests that structural or contextual factors do show impacts on the earnings attainment of individual workers to some extent. However, these approaches tend to ignore the role of individual workers' human capital characteristics which are found to affect worker's economic outcomes at varying degree in the pervious chapter. Also, little is known if the contextual factors enhance or constrain the effects of individual human capital characteristics on earnings. The review also indicates that most of the studies are based on the black-white dichotomy or Asian Americans as a single entity; relatively little is known about the effects of contextual or labor market characteristics on the earnings of Chinese individual workers in the U.S. labor market. Like the individualistic approaches, given their insights into the earnings mechanism of individual workers, structural or macro approaches at best provide a partial explanation of the economic outcomes of individual workers. Therefore, a conceptual model and analytic technique that will take into account both individual and contextual characteristics are needed. The following chapter will present a conceptual model and research hypotheses for this dissertation. Chapter VI will discuss the data, measurement of variables, and methodology used in the analysis.

CHAPTER V

CONCEPTUAL MODEL AND HYPOTHESES

The empirical studies reviewed in the last two chapters reflect two major research traditions, namely, the individualistic and structural/macro approaches. Although proceeding at different levels, these two approaches all focus on the sources of earnings differentials in the labor market. Each approach has received at least some empirical support, though not necessarily addressing Chinese Americans specifically. In other words, empirical research conducted at each level has provided a partial explanation of the earnings attainment of individual workers in the U.S. labor markets. However, just as each approach has its own merits, each has some inherent problems.

The individualistic studies, mainly in the rubric of human capital tradition, have tended to focus on the influences of micro-level factors, such as individual worker's educational attainment and labor force experience, on racial or gender differentials in earnings. For example, the first model of this kind (Mincer 1958) starts by assuming that the differential investment in human capital results in differences in economic outcomes. Although these assumptions are not inherent in the human capital approach over time and have been relaxed as needed later, little attention has been given to macro-level factors such as the characteristics of an ethnic group and of the local labor market that may affect the formation of the earnings differences within or among racial/ethnic groups. Studies that fail to take these factors into account in conjunction with worker characteristics tend to either overestimate the importance of the individual's

qualifications or treat the contribution of these macro factors as nonexistent, trivial or at most homogeneous across the labor markets, if any.

In the same vein, the assimilation approach assumes that all immigrants encounter competitive and homogeneous labor markets in the United States (Tienda 1983). With sufficient length of time, foreign-born individuals should eventually achieve socioeconomic parity with their U.S.-born counterparts and the majority group (Gordon 1964; Chiswick 1978, 1980). However, Portes and Bach (1985) claimed that the distinct social contexts which receive and incorporate immigrant groups decisively affect their collective fates, regardless of the skills that they bring to the United States.
Again, much writing on the earnings attainment of immigrants has focused on individual characteristics; relatively little attention has been given to the potential effects of ethnic group and local labor market characteristics on the economic outcomes of individual immigrants.

In short, both human capital and assimilation perspectives are basically individualistic approaches that tend to look mainly at individual differences for the sources of economic success while assuming by default that the labor markets are fully free and homogeneous. Although few dispute that individual characteristics have an impact on earnings, many argue that they are not sufficient to fully explain Asian American earnings patterns (e.g., Nee and Wong 1985; Hurh and Kim 1989). Actually, sociologists are not the only ones who recognize that earnings differentials cannot be attributed to the characteristics of individual workers per se, for the importance of labor markets as determinants of socioeconomic status has long been emphasized (e.g.,

Hanushek 1973, 1981; Stozenberg 1975; Parcel 1979); economists have long maintained that the economic outcomes of individuals are affected by characteristics of labor and the market (Marini 1989). This is what the second major research tradition—structural approach--tends to emphasize. This kind of approach assumes that structural and areal factors that are above the individuals and out of their control may facilitate or hamper an individual's economic outcomes. This approach is macro, structural, or ecological in nature and is generally conducted at the aggregate level. Its explanations of the earnings gap between racial and ethnic groups focus primarily on the built-in features of the ethnic group and aspects of labor market structure that perpetuate its effect, be it negative or positive. However, it tends to overestimate the effects of contextual elements and ignore individual worker's characteristics. Like the individualistic perspectives, an approach of this kind also fails to tell a complete story about the determinants of earnings attainment in the labor market.

As indicated in Chapters III and IV, empirical research conducted in both traditions has informed social scientists and others a lot about the earnings attainment of Chinese and other racial/ethnic workers in the U.S. labor market. However, the two research traditions—individualistic and macro approaches are like two parallel lines pointing to the same direction without convergence. Consequently, little is known about the relative effects of personal and contextual factors on the earnings attainment of individuals, particularly of minority and immigrant workers. Equally little is known about the indirect impacts that contextual factors impose on earnings through personal characteristics. Research needs to go beyond either individualistic or structural approach

per se and integrate elements from both traditions. Only with an effective integrated framework will researchers be able to gauge not only the extent to which each level of factors contributes to earnings attainment but also the extent of impact of contextual factors that function through individual factors.

This dissertation is an attempt to bring the two major research traditions together. Specifically, the study aims to examine the effects of the following factors on the wage earnings of Chinese workers in the United States: 1) individual worker's human capital characteristics; 2) the contextual factors of the labor market to which the worker belongs. At the same time, the mediating effects of the contextual factors on individual factors are also examined. In order to develop an appropriate model of earnings attainment for Chinese Americans, the two major research traditions that have previously been utilized to study earnings inequality among racial/ethnic groups are integrated. This integrated perspective maintains that individual workers are located in different social contexts and their economic mobility is a dynamic process that is subject to the direct influences of both their own personal characteristics and varying contextual factors, including their group's characteristics and local labor market conditions. At the same time, the effects of personal characteristics on the earnings attainment of individuals may be enhanced or depressed by the contextual factors. A simplified earnings paradigm is shown as Figure 3.

With this integrated framework, individual paradigms such as human capital and assimilation serve a natural starting point for the study of earnings attainment: the differences in earnings originate from the variation in specific personal characteristics—

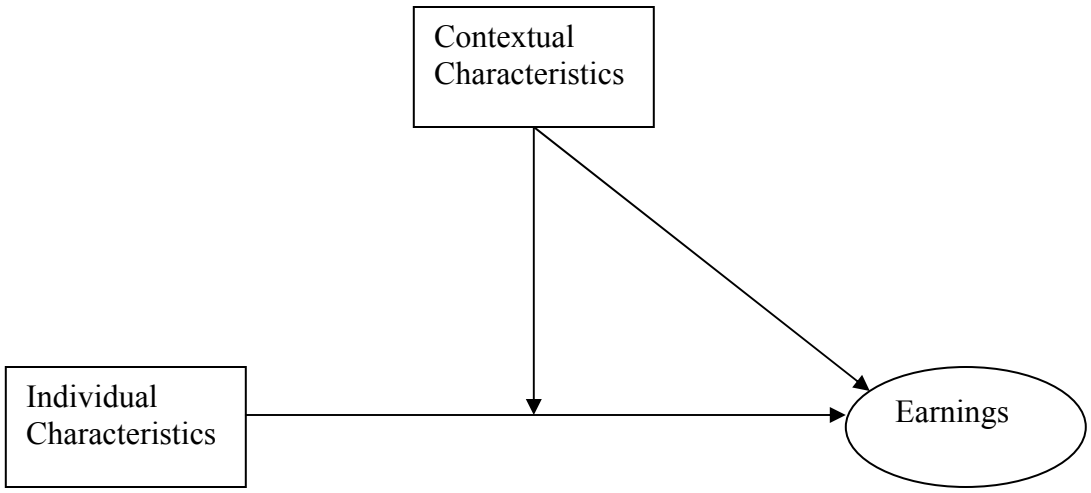

Figure 3. The Earnings Attainment Paradigm

such as education achievement, labor market experience, and so forth. For foreign-born individuals, assimilation is a process of re-education in which they acquire the necessary U.S. social and cultural credentials, proficiency of English language, and information of the labor market, all of which serve to move them upwards on the socioeconomic ladder during their stay in the country.

However, the returns to investment in human capital are also subject to the influences of contextual factors, such as group size, social capital (e.g., the presence or absence of ethnic businesses in local areas), occupational and residential distribution patterns, and the economic conditions of the local market. The effects of these contextual factors on the earnings of individuals may vary. While some may serve to facilitate individuals' socioeconomic mobility, others may block or slow down their progress. For example, the increase of Chinese and/or Asian populations in a labor market may have a

positive impact on the earnings of the group members because of its potential conversion of numeric strength into both political and economic power. Politically, an expanding minority population can strengthen its negotiating power with employers and avoid or at least mitigate job discrimination and detrimental consequences against its members. That is to say, when the minority population becomes large enough and reaches a critical mass, it may be able to mobilize resources and gain enough political power to battle discriminatory practices in the labor market. Economically, a large minority population may lead to the establishment of an ethnic economy or ethnic labor market. And an increasing minority population provides both a sustained labor supply and patrons necessary for the survival and flourishing of the ethnic economy.

The effects of personal characteristics on earnings are also subject to the influence of social capital, which refers primarily to "resources accessed in social networks" (Lin 1999).

Social capital is not a single entity but a variety of different entities, with two elements in common: they consist of some aspects of social structure, and they facilitate certain actions of actors—whether persons or corporate actors—within the structure (Coleman 1988). Kinship, friendship, and ethnic group ties are some basic forms of social capital because of the mutual obligations and expectations implied in the relationship. Like physical capital and human capital, social capital serves to facilitate productive activity, making possible the achievement of certain ends that would not be possible otherwise.

As a corporate actor of social capital, the ethnic economy provides both the

minority business owners and co-ethnic workers an alternative avenue for upward mobility. Linked by ties of culture, genealogy and history, religion, race, or national origin, the ethnic economy not only provides co-ethnic members access to information, social networks, and social support, but also shelters them from various forms of discriminatory practices that may occur in the mainstream economy.

Also, "ethnic hegemony" occurs when an ethnic minority has sufficient capital and entrepreneurial skills to dominate and control an economic activity, occupational or industrial niche, or specific segment of the labor market (Jiobu 1988). In the ethnic hegemonic segment of the labor market, minority workers can attain higher returns on their human capital resources and enjoy better opportunities for promotion and rewards than those available for them in the larger economy.

Apart from social capital, the occupational distribution of Chinese Americans may also be important in determining earnings of individual workers. Occupation typically serves as an intervening factor between human capital and earnings attainment. That is to say, it is through occupations that human capital such as education and labor force experience can be converted into earnings; at the same time occupations help to define networks of acquaintances, and further opportunities for labor market success (Barringer et al 1993).

A native-born individual may be pushed out of desirable occupations because of the lack of human capital and discrimination in one way or another; for an immigrant, apart from a lack of human capital and discrimination, language deficiency, non-transferability of foreign credentials and skills, too specific training, unfamiliarity with

the American social system, various forms of culture shock, and so on, may send them to jobs at the bottom of the occupational hierarchy. Consequently, their possibilities for social mobility are limited. Individual workers cannot improve their earnings before they have full access to a wide range of occupations commensurate with their training and skills.

Not only segregation in occupations but also segregation in residence has adverse impacts on the earnings of individual workers. Chinese Americans, particularly recent immigrants, tend to reside in or near ethnic ghettoes. In earlier times, because cities or large labor markets were not highly separated from each other, people usually could work where they lived. In modern times, however, there is often a substantial travel distance between home and worksite which is typically located away from a ghetto. Consequently, a ghetto or segregated neighborhood means limited opportunities to participate in the more dynamic, more protected, or more rewarded segments of the larger economy. Since segregated residents can not participate in the mainstream economy, they have no opportunity to build or maximize both human and social capital that will help them advance in the larger society.

Drawing on the empirical literature and the integrated perspectives discussed above, it is hypothesized that:

1) Human capital in the form of educational achievement, labor market experience, and English proficiency for immigrants, is positively related to wage earnings of Chinese workers, other things being equal;

2) The relative size of the Chinese/Asians/nonwhite population is positively related to wage earnings of Chinese workers, independent of other determinants;
3) Social capital measured as the percentage of Chinese-owned businesses in an MSA is positively related to wage earnings of Chinese workers;
4) Occupational segregation between Chinese and majority whites is negatively related to the wage earnings of Chinese. That is to say, only when the occupational distribution of Chinese is more similar to that of the majority whites in a local market can they have fuller access to the varied employment opportunities, and enjoy higher wage earnings, other things being equal.
5) Residential segregation with the majority whites is negatively related to the wage earnings of Chinese individuals in the labor market, independent of other factors.

Since the study is conceptualized in two levels, namely, individual and contextual characteristics are hypothesized to play roles in shaping the economic outcomes of individual workers, data on the two levels and an appropriate methodology to incorporate the two levels of data are needed. The following chapter presents the data sources, operationalization of variables, and the appropriate method that will be used to integrate the two levels of variables and to test the above research hypotheses.

CHAPTER VI

DATA, MEASUREMENT OF VARIABLES, AND METHODOLOGY

As mentioned earlier, this dissertation is an attempt to bring the two major research traditions together by examining the effects of individual's human capital characteristics and contextual factors on the wage earnings of Chinese workers in the United States. It is assumed that individual Chinese workers form groups in local markets and that the aggregate characteristics of the group and labor markets have important impacts on the economic outcomes of individual workers. Methodologically, this dissertation estimates the earnings equation for Chinese as a function of individual characteristics, group characteristics, and labor market conditions. This chapter discusses the data sources for the individual and MSA characteristics, operationalization of the variables, and the appropriate method that are used to conduct the analysis.

Data Sources

The data for the individual workers are derived from the 2000 Public Use Microdata Samples (PUMS) of the U.S. Bureau of the Census (U.S. Bureau of the Census. 2003a, 2003b) and the group/contextual characteristics are taken from other sources described below. PUMS are chosen for two advantages. First of all, it is the largest national data set that contains many more earnings-related characteristics at the individual level compared to other datasets, such as the Current Population Survey, General Social Survey, among others. Secondly, the data provide information at several

geographic levels and thus facilitate the calculation of some of the aggregate characteristics. Some characteristics of an ethnic group and local labor market can be obtained by aggregating the individual data across the ethnic group or designated area.

The level-1 unit is the individual worker nested in a local labor market. For the analysis of earnings attainment, the universe is limited to respondents who classified themselves as "Chinese alone" or "Chinese and any other race/ethnicity" on the Census question on race. At the same time, they must be civilian workers aged 25-64 who worked at least 10 weeks and reported at least $1,000 earnings in 1999. Arbitrary as it is, the age range is imposed in order to consider only those individuals in the productive period of their life cycle. It is assumed that by age 25 individual persons have completed virtually all of the education they are likely to attain, and that by age 65 they are likely to enter retirement. Because of the restrictions, unpaid family workers, sporadic labor market workers, and those who were in the labor force but earned less than 1,000 dollars in 1999 are excluded from the analysis.

The local labor market, proxied by Metropolitan Statistical Area (MSA), serves as the level-2 unit. MSAs are defined by the Office of Management and Budget as a core area containing a substantial population nucleus, and highly integrating with adjacent communities both economically and socially (Office of Management and Budget 2000).

There are a couple of advantages associated with the use of the MSA as level-2 units. First of all, among Asian Americans, Chinese are the most urbanized (Wong 1986). As supporting evidence, Table 3 indicates that the percentages of Chinese men and women in farming, fishing and forestry occupations have been shrinking from 4.1

percent (men) and 0.8 percent (women) in 1940 to a negligible 0.1 percent for both in 1999. Since the majority of Chinese are MSA dwellers, the emphasis on MSA residents and its use as the unit of level-2 analysis should not be a liability. Secondly, the MSA is the geographical level that contains enough Chinese workers for an appropriate statistical analysis after applying the above selection restrictions. Finally, traditionally, the MSA has been treated as a proxy for the local labor market (Thompson 1965; Parcel 1979; Jones and Rosenfeld 1989; Cassirer 1996). As such, this makes it easy for comparison with other studies.

The general rule for an MSA to be included in the analysis is that it must have a sample of at least 50 Chinese members that meet the above criteria so that they are relatively representative of the populations from which they are drawn. However, because of the relative small sample size of Chinese American workers in most metropolitan areas, the 1 percent and 5 percent PUMS files were combined into one so as to obtain more areas with a minimum of 50 subjects that meet the above criteria. These two PUMS files prepared by the U.S. Bureau of the Census are independent representative samples of the U.S. population. They are also comparable in terms of methods of data collection, wording of questions, structure, universe, and coding. After the combination, a sample size of 50 represents a minimum of around 1,000 in an MSA when inflated. Since only MSAs that meet the criteria stated above are included, generalization should not be made to the others.

The 2000 census sample includes 49,602 Chinese workers located in 70 U.S. metropolitan areas. These 70 MSAs contain 84.7 percent of the Chinese who claimed

one or more races in the United States. A detailed list of the MSAs is shown in Table 7.

Measurement of Variables

Hourly Wage [LOGWAGE]--Hourly wage in 1999 is used as the dependent variable of the earnings determination model for Chinese Americans. The calculation of hourly wage is based on a worker's total annual earnings--the sum of wage or salary income and net income from self-employment in dollars, weeks worked, and number of hours worked per week in 1999. A preliminary examination using OLS shows that the residuals get bigger for bigger values of the dependent variable; a normality test also indicates that the distribution of the wage earnings is heavily skewed to the right and leptokurtic. As such, logarithmic transformation of hourly earnings is used to reduce influence bias caused by cases of high wage-earners that otherwise skew the distribution [5] (Hauser 1980). Since the dependent variable is in log form, the regression coefficients are estimates of the percentage change in earnings rather than absolute dollar differences in earnings levels associated with the changes in the independent variables.

There are two levels of independent variables. Level-1 includes individual characteristics, and level-2 includes contextual characteristics**.** The major individual characteristics include such human capital as educational attainment, labor market experience, and English language ability. In order not to bias the estimates of the

[5] A total of 31 cases with hourly wage less than $1 were dropped from analysis because of the negative log values.

Table 7. Selected Metropolitan Areas (MSAs) and Their Characteristics

MSA TITLE	N	%Chinese	%Asian	%Nonwhite	occseg	%buz	resiseg	Unemploy Rate
Akron, OH PMSA	58	0.35	1.3	14.6	0.92	1.06	0.49	4.07
Albany-Schenectady-Troy, NY MSA	85	0.59	1.8	11.9	0.87	0.82	0.50	3.58
Atlanta, GA MSA	503	0.63	3.3	40.2	0.71	3.05	0.54	3.20
Austin-San Marcos, TX MSA	224	0.99	3.5	39.3	0.76	2.27	0.47	2.44
Baltimore, MD PMSA	318	0.62	2.7	33.7	0.77	2.93	0.61	4.58
Bergen-Passaic, NJ PMSA	409	1.30	8.2	35.1	0.75	4.30	0.37	4.50
Boston, MA-NH PMSA	1,566	2.27	4.9	20.0	0.60	4.43	0.50	2.75
Buffalo-Niagara Falls, NY MSA	56	0.34	1.3	17.5	0.90	0.89	0.61	5.34
Charlotte-Gastonia-Rock Hill, NC-SC MSA	54	0.31	1.9	28.8	0.90	1.03	0.52	2.61
Chicago, IL PMSA	1,481	0.92	4.6	42.0	0.71	3.08	0.67	4.21
Cincinnati, OH-KY-IN PMSA	91	0.31	1.2	16.5	0.89	0.62	0.55	3.45
Cleveland-Lorain-Elyria, OH PMSA	178	0.38	1.4	24.6	0.85	1.82	0.66	4.44
Columbus, OH MSA	192	0.65	2.4	19.6	0.80	1.77	0.50	2.65
Dallas, TX PMSA	625	0.88	4.0	43.8	0.70	3.67	0.54	3.16
Denver, CO PMSA	226	0.59	3.0	29.6	0.79	2.03	0.32	2.78
Detroit, MI PMSA	381	0.45	2.3	30.3	0.81	1.26	0.59	3.51
Fort Lauderdale, FL PMSA	238	0.65	2.3	42.0	0.78	2.54	0.38	4.30
Fort Worth-Arlington, TX PMSA	127	0.42	3.2	34.4	0.83	2.33	0.47	3.23
Fresno, CA MSA	100	0.69	7.1	59.4	0.84	3.05	0.37	13.69
Greensboro-Winston-Salem-High Point, NC MSA	57	0.20	1.4	27.7	0.91	0.71	0.52	2.53
Honolulu, HI MSA	1,547	15.57	46.0	80.0	0.51	46.10	0.37	5.16
Houston, TX PMSA	1,030	1.25	5.2	53.9	0.68	7.25	0.55	4.31
Indianapolis, IN MSA	78	0.32	1.2	19.2	0.89	0.81	0.60	2.48
Jacksonville, FL MSA	64	0.24	2.3	29.6	0.89	4.01	0.49	3.04
Jersey City, NJ PMSA	168	1.36	9.4	64.7	0.80	7.76	0.40	7.28
Kansas City, MO-KS MSA	105	0.33	1.6	21.7	0.87	1.01	0.61	3.40
Las Vegas, NV-AZ MSA	176	0.98	4.7	36.9	0.79	4.15	0.39	4.31
Los Angeles-Long Beach, CA PMSA	7,837	3.96	11.9	68.9	0.47	21.26	0.60	6.20
Louisville, KY-IN MSA	60	0.20	1.1	18.0	0.93	0.85	0.54	3.33
Miami, FL PMSA	176	0.57	1.4	79.3	0.81	4.35	0.37	6.12
Middlesex-Somerset-Hunterdon, NJ PMSA	650	2.83	11.2	31.8	0.69	7.70	0.43	3.22
Milwaukee-Waukesha, WI PMSA	65	0.33	2.1	25.6	0.88	1.03	0.53	3.20
Minneapolis-St. Paul, MN-WI MSA	224	0.55	4.1	15.3	0.79	1.22	0.42	2.10
Modesto, CA MSA	55	0.60	4.2	42.7	0.90	0.75	0.31	11.43
Monmouth-Ocean, NJ PMSA	296	0.99	2.7	15.2	0.78	3.87	0.51	4.29

Table 7. *(Continued).*

MSA TITLE	N	%Chinese	%Asian	%Nonwhite	occseg	%buz	resiseg	Unemploy Rate
Nashville, TN MSA	58	0.26	1.6	22.0	0.91	0.79	0.57	2.71
Nassau-Suffolk, NY PMSA	649	1.07	3.6	23.6	0.65	3.63	0.37	3.28
New Orleans, LA MSA	65	0.32	2.1	45.3	0.89	1.15	0.61	4.61
New York, NY PMSA	7,259	4.21	9.1	60.4	0.47	21.37	0.55	6.72
Newark, NJ PMSA	587	1.16	4.0	41.1	0.71	4.53	0.49	4.47
Norfolk-Virginia Beach-Newport News, VA MSA	120	0.33	2.7	38.9	0.88	1.85	0.48	3.41
Oakland, CA PMSA	3,562	6.58	16.7	52.3	0.49	23.71	0.44	3.61
Orange County, CA PMSA	1,578	2.55	13.6	48.7	0.59	14.23	0.37	2.77
Orlando, FL MSA	227	0.52	2.7	34.9	0.81	3.14	0.40	2.83
Philadelphia, PA-NJ PMSA	668	0.86	3.4	29.8	0.70	3.39	0.63	4.24
Phoenix-Mesa, AZ MSA	388	0.60	2.1	34.2	0.72	2.62	0.39	2.88
Pittsburgh, PA MSA	91	0.33	1.1	10.9	0.89	0.86	0.62	4.46
Portland-Vancouver, OR-WA PMSA	344	1.18	4.6	18.4	0.73	2.68	0.37	4.36
Providence-Fall River-Warwick, RI-MA MSA	63	0.50	2.2	16.6	0.86	1.45	0.47	4.57
Raleigh-Durham-Chapel Hill, NC MSA	138	0.88	2.9	33.2	0.83	1.95	0.47	1.66
Richmond-Petersburg, VA MSA	56	0.42	2.1	36.0	0.89	1.60	0.48	2.50
Riverside-San Bernardino, CA PMSA	376	0.79	4.2	52.7	0.73	9.73	0.46	5.62
Rochester, NY MSA	50	0.49	1.8	17.8	0.89	0.13	0.53	4.08
Sacramento, CA PMSA	747	2.35	8.9	35.7	0.65	12.29	0.58	4.45
St. Louis, MO-IL MSA	177	0.40	1.4	22.6	0.84	1.33	0.60	4.00
Salt Lake City-Ogden, UT MSA	142	0.58	2.2	17.2	0.81	1.69	0.36	3.59
San Antonio, TX MSA	87	0.33	1.5	60.6	0.88	3.27	0.41	3.41
San Diego, CA MSA	820	1.40	8.9	45.0	0.66	3.56	0.44	3.30
San Francisco, CA PMSA	4,705	12.73	22.7	48.8	0.46	38.30	0.54	2.70
San Jose, CA PMSA	3,346	7.67	25.6	55.8	0.51	26.63	0.40	3.14
Seattle-Bellevue-Everett, WA PMSA	1,207	2.49	9.4	23.7	0.59	6.96	0.47	3.24
Stockton-Lodi, CA MSA	125	1.24	11.4	52.6	0.81	10.30	0.51	9.70
Tacoma, WA PMSA	65	0.53	5.1	24.0	0.86	1.54	0.28	4.54
Tampa-St. Petersburg-Clearwater, FL MSA	164	0.30	1.9	24.0	0.83	0.75	0.42	2.89
Toledo, OH MSA	55	0.35	1.1	19.9	0.91	0.75	0.52	4.84
Tucson, AZ MSA	121	0.66	2.0	38.5	0.83	3.34	0.35	2.95
Vallejo-Fairfield-Napa, CA PMSA	90	1.13	10.4	46.0	0.80	0.77	0.38	4.73
Ventura, CA PMSA	172	1.08	5.3	43.2	0.79	6.24	0.29	5.17
Washington, DC-MD-VA-WV PMSA	1,695	1.49	6.7	43.9	0.62	6.64	0.46	2.92
West Palm Beach-Boca Raton, FL MSA	105	0.39	1.5	29.4	0.86	0.50	0.37	5.34

independent variables, such control variables as gender, marital status, and employment sectors are introduced into the models.

Although numerous contextual factors may affect the earnings attainment of Chinese Americans, because of data limitations, level-2 analysis will focus on such contextual characteristics as racial composition (percent of Chinese, percent of Asian and percent of non-white), occupational segregation between Chinese and whites, residential segregation between Chinese and whites, and percent of Chinese-owned businesses in an MSA (a proxy of social capital). Labor market condition measured as unemployment rate is used as a control variable. Detailed operationalization of the independent variables is presented as following:

Educational Attainment [EDU]--Based on the respondent-provided information on the grade/degree or diploma, education is scored on the scale of values proposed by Blau and Duncan (1967) with some minor modifications:

0 = No schooling completed;

1 = Elementary, nursery to fourth grade;

2 = Elementary, fifth to eighth grade;

3 = Elementary, ninth grade;

4 = High school, tenth to twelfth grade;

5 = High school, graduate;

6 = College, some college to associate degree;

7 = College, Bachelor's degree, and

8 = College, Master's degree and above.

Labor Market Experience [LABOR]--Since the census does not include any question regarding labor market experience, an approximate measure of individual men's labor market experience is derived by subtracting years of schooling and 6 pre-schooling years from age reported, assuming that labor market experience begins when schooling ends and that labor force participation does not discontinue [6]. Since the census does not provide the exact number of years of schooling completed, the duration of schooling is approximated as the number of years it typically takes to complete that particular grade or degree. Specifically, the grade/degree the respondent reported is converted to years of equivalent full-time study using the following scale:

0 = No schooling completed;

2 = Nursery school to 4th grade;

5.5 = 5th grade or 6th grade;

7.5 = 7th or 8th grade;

9 = 9th grade;

10 = 10th grade;

11 = 11th grade;

11.5= 12th grade with no diploma;

12 = High school graduate;

12.5= Some college but less than 1 year;

13.5= One or more years of college with no degree;

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[6] Five cases with negative values were set to zero.

14 = Associate degree;

16 = College degree;

18 = Master's degree;

21 = Doctorate degree.

The labor market experience of women, particularly for married women with children in the home, will not be measured in the same way as men because their labor force participation may not be continuous due to childbearing over the life cycle (Mincer and Polachek 1974; Tolbert et al. 1980; Gwartney and Long 1978; Long 1980). A reasonable estimate of women's work experience would partition the post-school period into intervals of labor market work and childcare time. When no detailed information on actual work histories is available, Oaxaca (1973) suggested including the number of children ever born to the female in the earnings function to control for the experience and earnings-power losses resulting from labor force interruption for child bearing and care. Gramm (1975) also suggested that when work experience is not actually measured, variables reflecting the age structure of children living at home should be included as controls when dealing with the labor force experience of married women.

Although Mar (2000) argued that the variable derived from current age and years of schooling may still be able to capture the actual experience of Asian American women because of their greater attachment to the work force evidenced by their higher labor force participation rate, the possible effect of childbearing and childcare on labor market outcomes of married women with children is considered in this dissertation. And for purpose of parsimony, this analysis follows the strategy employed by Poston and Jia

(1989): apart from years of schooling and 6 pre-schooling years, women's work experience is approximated by further subtracting the number of own children, assuming that each birth represents one year of lost labor force experience. Since the 2000 census does not provide information on the number of children ever born, the calculation is based on the information about the number of own children, the number of children under age 6 and between ages 6 and 18 living in the household. Specifically, a respondent is assumed to have one child when reporting "With own children under 6 years only", two when reporting "With own children 6 to 17 years only", three when reporting "With own children under 6 years and 6 to 17 years", and zero when reporting "No own children under 18 years"[7].

Language Ability [ENGLISH]--It is a dummy variable with those reporting a good command of English coded as "1" and others as "0".

Man [MAN]--It is a dummy variable with male coded as "1" and female "0".

Married [MARRIED]--It is coded as a dummy variable with "Married with spouse present"=1, Else=0.

Employment Sector--It classifies workers into three categories: employee of private company [PRIVATE], employee of government [PUBLIC], and self-employed [SELFEMP] (reference).

Racial Composition--Percentage of Chinese Americans [%CHINESE], percentage of Asian Americans [%ASIAN], and percentage of non-whites

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[7] Three cases with negative values were set to zero.

[%NONWHITE] in an MSA, are derived from the Census 2000 Summary File 1 (SF-1) 100 percent data.

Social Capital [%BUZ]--There are various forms of social capital. It can be measured at either individual or aggregate level or both. This dissertation focuses on social capital measured as the percentage of Chinese-owned businesses in an MSA based on the 1997 Economic Census (U.S. Bureau of the Census 2001a) and the Statistics of U.S. Businesses (U.S. Bureau of the Census 2005).

Occupational Segregation [OCCSEG]--Research on occupational segregation has traditionally employed the index of dissimilarity given by Duncan and Duncan (1955b).

However, the index has an important disadvantage: when a sample is small and its share of the labor force is also small, random fluctuations alone can produce a high index value (Cortese, Falk, and Cohen 1976; Cotter, Hermsen, and Vanneman 2003).

This dissertation overcomes the fluctuation problem by means of size-standardization (Gibbs 1965). First, 1,000 persons are assigned to each occupational category based on the Chinese-to-white ratio in each category as reported in the census data. Then, the new numbers are applied to the formula for calculating the Index of Dissimilarity:

Size-standardized $D = [\sum(p_{1i}/p_1 - p_{2i}/p_2)]/2$

where:

p_{1i} = number of Chinese workers in occupation *i* in an MSA

p_{2i} = number of white workers in occupation *i* in an MSA

p_1 = total number of Chinese workers in an MSA

p_2 = total number of white workers in an MSA..

The biggest advantage of the dissimilarity measure is its intuitive meaning and easy interpretation. The values of the measure, ranging from zero (perfect integration) to one (complete segregation), indicate that fraction of either population being compared that would have to change occupations for the two groups to achieve an identical distribution among occupations. The index is computed for each MSA from the detailed occupational distributions provided in the 2000 PUMS files.

Residential Segregation [RESISEG]--The calculation is based on the 2000 Summary File (SF 1) 100 percent data. To avoid random fluctuations, size-standardization process (Gibbs 1965) is also used. Specifically, 1,000 persons are assigned to each census tract based on the Chinese-to-white ratio derived for each tract. The index is one-half the sum of the absolute differences between the distributions of Chinese and white residents in each tract in an MSA:

Size-standardized $D= 100*[\sum(x_i/X-y_i/Y)]/2$

where:

x_i = number of Chinese residents in census tract *i* in an MSA

y_i = number of white residents in census tract *i* in an MSA

X = total number of Chinese residents in an MSA

Y = total number of white residents in an MSA.

The D value ranges from zero to one. A value of zero means that two groups are similarly distributed or completely integrated across the tracts of the MSA. Complete

segregation occurs when the index has a value of one. That is to say, every census tract contains only members of one group. The index may be interpreted as the proportion of either group that would have to change locations (census tract) in order to achieve an identical distribution.

Unemployment Rate [UNEMPLOY]--The rate for each MSA is obtained from <*economagic.com*>. The website reports the unemployment data by MSA and by month of each year. Since the Bureau of the Census reported the individual earnings for 1999, and to avoid possibly dramatic fluctuations in that year, an average annual rate of 1998 and 1999 is used to gauge the effect of unemployment rate on the earnings of individuals in the labor market. As an indicator of economic well being, it is incorporated in the model as a control variable and is expected to be negatively associated with earnings attainment.

Having operationalized the independent variables at the two levels, the following section proceeds to examine the appropriate research method that can better integrate both the individual and aggregate variables into one single model.

Methodology: Why Multilevel?

Sociological inquiry by means of multilevel analysis can be traced back to the respective works of Marx, Durkheim, and Weber, among others (DiPrete and Forristal 1994). These works suggest that social contexts have impacts on individual-level outcomes, and that individuals respond to their social contexts. Human ecologists also hold that the properties of social aggregates not only affect macro-level social change

but also condition the lives of individuals (Hawley 1950). Network theorists believe that societal aggregates condition individual behavior and life chances through opportunities and constraints (Blau 1994).

In the social sciences, multilevel or hierarchically structured populations are the norm. For example, individuals are usually nested within a group and social structures. How the characteristics of individuals are related to the characteristics of groups and social structures in which the individuals function has been at the center of much study. Specifically, to what extent is an individual outcome, like wage earnings, affected by ascribed and achieved characteristics, and to what extent is it affected by the social environment? In general, one can take into account the hierarchical relationship between social aggregates and individuals through one of the following approaches: 1) disaggregation, 2) aggregation, 3) dummy treatment, 4) regional/case study, 5) contextual/Hierarchical Linear Modeling (HLM) analysis; and 6) two-stage regression.

Disaggregation refers to the procedure that all higher level or contextual level data are disaggregated down to a lower level. Each lower level unit is then assigned a score representing the higher level unit within which it is nested. The higher level units are treated as if they were measured at the lower level and the analysis is then conducted at the lower level. For example, all individuals in a metropolitan area might receive scores representing characteristics of the area, such as the unemployment rate, and percentage of minority population. Although implying that social contexts impact individual outcomes, this approach violates the assumption of independence of observations that is basic for the application of classic statistical techniques (de Leeuw

1992:xiv). Consequently, the individual effects and the aggregate effects may be confounded, and often end up in asserting that the aggregate effects are more important than the individual effects or vice versa (Kreft and de Leeuw 1998; Iversen 1991).

Alternative to disaggregation is aggregation. Here one aggregates lower level units up to a higher level and conducts the analysis at the higher level. For example, one can examine the relationships between ethnic group characteristics and individual earnings by aggregating the individual earnings to the group level using mean or median earnings. de Leeuw (1992:xiv) noted that this approach tends to discard all the potentially meaningful individual level variation in the outcome, which often is as much as 80 or 90 percent of the total variation before the actual analysis starts. As a result, relations between aggregate variables are not only much stronger but also different from the relationships between the non-aggregate variables. The "ecological fallacy" may result if one attempts to interpret the aggregate relationships at the individual level (de Leeuw 1992: xiv; Kreft and de Leeuw 1998; DiPrete and Forristal 1994; Blalock 1984).

Apart from disaggregation and aggregation, a traditional method of integrating indicators from a higher-level unit into a lower level model is by using dummy variables. For example, to measure the effect of residence or region on the earnings attainment of individuals, one can create a set of dummy variables representing each region and then include them in the model. Convenient as it is, the shortcomings of this approach are obvious: which specific dimensions of these categories contribute to the observed effects are unknown. Therefore, instead of a dummy variable, specific dimensions of the region,

such as percentage of college-educated population, should be incorporated to unmask what exactly is contributing to the observed effects.

Of course, a regional study can be conducted for the purpose of controlling for some social attributes by default. For example, Cabezas and Kawaguchi (1988) and Nee and Sanders (1985) limited their analyses of the economic achievement of Asian Americans to California where Asian groups are heavily concentrated. Zhou and Logan (1989) studied the returns of human capital among Chinese Americans in New York City's Chinatown. Although the methods bring about insights that cannot be achieved otherwise, their efforts are compromised to some extent because of generalizability issues.

Over the past decades, one of the major developments in building the connection between individual and aggregate attributes is contextual or multi-level analysis. The multilevel techniques have different names, including hierarchical linear modeling, multilevel models, context analysis, context-effects models, just to name a few. In spite of this, "The essential feature of all contextual-effects models is an allowance for macro process that are presumed to have an impact on the individual actor over and above the effects of any individual-level variables that may be operating" (Blalock 1984:354). The fundamental assumptions of multilevel analysis are 1) "the micro values of the response variable in some way depend on context and that the effects of the micro determinants may vary systematically as a function of context" (Mason et al. 1983-4:74), and 2) the effects of context are homogeneous for all units located in the same context (DiPrete and Forristal 1994:340). The notion of context is quite general and can be spatial (e.g.

country, state, metropolitan area, city, community), temporal (i.e., history), organizational (classrooms, schools, firms), and socioeconomic and cultural (ethnic groups, social classes, economic sectors).

Multilevel modeling is generally employed to analyze data that consist of multiple macro units (contexts) and multiple micro units (individuals) nested in macro units. It explains micro level outcomes in two ways: 1) showing that parameters of models specified at the individual level--where individual level characteristics are used to explain individual level outcomes--are a function of context, and 2) showing that this individual-aggregate relationship can be expressed in terms of the contextual characteristics (DiPrete and Forristal 1994). Drawing on Guo and Zhao (2000), Bryk and Raudenbush (1992), and others, this kind of multilevel modeling has two major positive gains.

First, a multilevel model provides a convenient framework for modeling both individual and aggregate level variance in individual outcomes while using individual predictors at the individual level and specific contextual predictors at the aggregate level. Investigator can then partition the variance and covariances of random effects between individual and aggregate levels and statistically decompose the total variance in the outcome variables into portions, thus allowing for gauging appropriately the explanatory power associated with each level (Bryk and Raudenbush 1992). For example, if most of the variation in earnings occurs between labor markets, one might reasonably conclude that the local labor market is a major determinant of earnings achievement. In contrast, if the bulk of variation is found within the labor markets, then one can claim that

differentials in individual characteristics play the major role in shaping the economic outcomes. These types of analyses are natural products of a random-effects multilevel analysis (DiPrete and Forristal 1994).

The second major strength of multilevel modeling is that it addresses cross-level interactions neatly. In a cross-level interaction, a variable at the higher level conditions the relationship between variables at a lower level. For example, a larger scale of ethnic economy may help a group member convert his or her human capital into earnings more easily. In this case, the higher-level unit provides a context which modifies the relationships between lower-level unit relationships.

Multilevel modeling techniques represent an improvement in gauging the relationship between individuals and the contexts in which they are embedded. Because one can model explicitly both within and between higher level unit variance as well as examine the influence of higher level units on lower level outcomes while maintaining the appropriate level of analysis, multilevel modeling techniques overcome the weaknesses associated with disaggregation, aggregation, and dummy treatment of aggregate characteristics. With such a framework, one can systematically look into how characteristics measured at each level affect the individual outcomes.

Two-stage modeling is another technique that can deal with individual and aggregate variables. It is an extension of regression to cover models that violate ordinary least squares (OLS) assumption of recursivity, and avoids the problems associated with disaggregation and aggregation.

Technically, multilevel modeling and two-stage modeling are all regressions of

regressions. That is to say, when exploring the relationships between individual characteristics and social structural factors, both techniques use the regression coefficients obtained at level-1 as dependent variables at level-2. However, unlike two-stage modeling, multilevel models simultaneously take into account variance in the standard errors of the level-1 coefficients when running level-2 regressions, and thus produce more reliable results. Multilevel models are also better than a two-stage approach in increasing the precision of estimated effects within ecological units, such as an MSA, by means of empirical Bayes estimation. Bayesian approach allows one to make inferences about the coefficient (γ) that are not conditional on specific point estimates; instead, the inferences are based on the posterior distribution given by the data (Bryk and Raudenbush 1992:47-8). For instance, if the sample size within an MSA is small, the estimator for each MSA will be a weighted composite of the information from that MSA and the relations that exist in the overall sample. That is to say, MSAs with smaller sample sizes will receive less weight in the estimation.

Obviously, multilevel modeling has a natural appeal for this dissertation which focuses on the earnings attainment of Chinese workers in the United States. This dissertation assumes that Chinese individuals are embedded in Chinese ethnic groups in labor markets proxied by MSAs; the earnings attainment of individual workers is affected by not only the individual characteristics, but also by the characteristics of both the ethnic group and the local labor market they belong to.

Hierarchical Linear Modeling (HLM; Bryk and Raudenbush 1992) techniques, which allow one to incorporate contextual characteristics along with individual-level

variables into one model, will be used to measure the effects on earnings at each level. HLM models the nested structure of the data by expressing the dependent variable "hourly wage" in a single hierarchical model as linear function of both the characteristics of individual workers (level-1) and those of the ethnic group and the local labor market (level-2) they are nested in.

Wage earnings models were run separately for: 1) Chinese who are born in the United States (including the continent, Puerto Rico, Guam, U.S. Virgin Islands, American Samoa, or Northern Marianas or born abroad of an American parent or parents; hereafter native-borns); 2) Chinese who were foreign-born but were citizens by naturalization (hereafter naturalized citizens), and 3) Chinese who were non-U.S. citizen foreign-born (hereafter non-citizens).

The following chapter proceeds to present a multilevel analysis of the effects of individual and contextual characteristics on the wage earnings attainment of the three Chinese groups.

CHAPTER VII

FINDINGS

This chapter begins with a presentation of the sample descriptive statistics, then moves on to a preliminary examination of the earnings variation within and across the labor markets (MSAs), the specification of empirical multi-level models, and finally proceed to the results of multilevel modeling of the wage earnings attainment of the three groups of Chinese workers in the U.S. labor market.

Sample Descriptive Statistics

Table 8 presents the sample descriptive statistics for the following three groups of Chinese workers in United States in 1999: native-borns (N=8,581), naturalized citizens (N=25,376), and non-citizens (N=15,614).

A comparison across the three groups shows that the native-born workers reported the highest mean wage earnings ($26.10), the naturalized citizens were second ($23.76), and those non-citizens were the lowest ($19.18). This finding is consistent with the literature that immigrants tend to earn less than their native counterparts because it takes time to adjust and adapt to the host society.

Table 8 also shows that the human capital characteristics vary by group. Specifically, the native-born Chinese reported that they had the highest mean value of educational achievement (6.79), naturalized citizens ranked second (6.13), and non-citizens had the least (5.93). That is to say, both the native-born and naturalized Chinese

Table 8. Sample Descriptive Statistics for Chinese Workers in the United States, 1999

	Native-borns (N=8,581)				Naturalized Citizens (N=25,376)				Non-citizens (N=15,614)			
Variables	**Mean**	**Std D**	**Min**	**Max**	**Mean**	**Std D**	**Min**	**Max**	**Mean**	**Std D**	**Min**	**Max**
WAGE	26.10	23.56	1	511.54	23.76	29.12	1	1,543.27	19.18	22.76	1.01	700.00
LOGWAGE	3.02	0.68	0	6.24	2.84	0.79	0	7.34	2.61	0.81	0.01	6.55
EDU	6.79	1.08	0	8	6.13	1.88	0	8	5.93	2.31	0	8
LABOR	17.10	10.20	0	53	22.17	10.88	0	58	18.79	11.82	0	58
ENGLISH	0.98	0.13	0	1	0.82	0.39	0	1	0.66	0.47	0	1
MAN	0.53	0.50	0	1	0.51	0.50	0	1	0.56	0.50	0	1
MARRIED	0.56	0.50	0	1	0.76	0.42	0	1	0.77	0.42	0	1
PRIVATE	0.71	0.45	0	1	0.76	0.43	0	1	0.84	0.37	0	1
PUBLIC	0.20	0.40	0	1	0.12	0.33	0	1	0.08	0.27	0	1
SELFEMP	0.09	0.28	0	1	0.13	0.33	0	1	0.08	0.27	0	1

were more likely to have attended some college and the non-citizens had close to some college education in 1999.

Labor market experience, another major component of human capital, does not seem to vary much between the native-borns (17.10) and non-citizens (18.79). Naturalized citizens reported more years of labor market experience (22.17) than the other two groups.

Regarding English language proficiency, almost all native-born Chinese (98%) reported that they were able to speak good English; 82 percent of naturalized Chinese and only 66 percent of non-U.S. citizen Chinese had a good command of the dominant language.

The statistics for the control variables are also presented in Table 8. The data show that the percentage of male workers in the non-citizen group (56%) is slightly higher than in the native-borns (53%) and the naturalized citizen group (51%). Naturalized citizens (76%) and non-citizens (77%) have about the same percentage of married workers; native-borns (56%) have 20 percentage points less than the other two groups. That is to say, the native-born Chinese were less likely to be married than foreign-born Chinese in 1999.

The data on the class of employment show that regardless of nativity and citizenship, Chinese were more likely to be employed in the private sector, with the non-citizens reporting the highest percentage (84%), the native-borns the lowest (71%), and the naturalized citizens in-between. The public sector is the second most popular choice among native-born Chinese workers (20%) and self-employment the least (9%). For the

two foreign-born groups, each has nearly the same percentages of members choosing the public sector and self-employment. Specifically, about 12 percent of naturalized citizens and 8 percent of non-citizens were employed in either the public sector or own their own businesses, respectively.

Table 9 shows separate zero-order correlation matrixes of the individual-level variables for the three Chinese groups. The matrix for the native-born Chinese is given in the top panel of the table. As expected, all the human capital characteristics are positively associated with log wage earnings at the significance level of 0.05. Male workers tend to earn more than female workers and married individuals compare favorably with people of other marital statuses. It is interesting to note that the log of wage earnings is negatively associated with employment in the private sector and positively related to self-employment but not correlated with employment in the public sector in any way.

Table 9 also shows that except for the three sets of dummy variables representing the employment sectors, all other variables are either weakly correlated or uncorrelated with one another for the native-born group.

The correlation matrixes for the two foreign-born groups in Table 9 show that except for the labor market experience, the correlations between the other two human capital variables and log wage earnings for the two groups are similar to those of the native-born group. For the native-born group, labor market experience is positively associated with wage earnings; however, a negative correlation exists for the two foreign-born groups. This probably means that labor market experience accumulated

Table 9. Correlation Matrixes of Individual and MSA-level Variables

Individual-Level Correlation Matrix

Native-Borns

Variable	Description	LOGWAGE	EDU	LABOR	ENGLISH	MAN	MARRIED	PUBLIC	PRIVATE
LOGWAGE	Log of mean hourly wage	1.000							
EDU	Educational level achieved	.358*							
LABOR	Labor market experience	.025*	-.312*						
ENGLISH	Speak good English	.080*	.146*	-.059*					
MAN	Male worker	.107*	-.008	.052*	.008				
MARRIED	Married with spouse present	.160*	.045*	.278*	-.010	-.001			
PUBLIC	Employed in public sector	.006	.072*	.120*	.017	-.045*	.045*		
PRIVATE	Employed in private sector	-.029*	-.086*	-.170*	-.011	-.010	-.085*	-.787*	
SELFEMP	Self-employed	.038*	.037*	.104*	-.007	.080*	.071*	-.154*	-.488*

Naturalized Citizens

Variable	Description	LOGWAGE	EDU	LABOR	ENGLISH	MAN	MARRIED	PUBLIC	PRIVATE
LOGWAGE	Log of mean hourly wage	1.000							
EDU	Educational level achieved	.502*							
LABOR	Labor market experience	-.187*	-.468*						
ENGLISH	Speak good English	.353*	.539*	-.361*					
MAN	Male worker	.147*	.077*	.040*	.043*				
MARRIED	Married with spouse present	.035*	-.050*	.262*	-.085*	.064*			
PUBLIC	Employed in public sector	.074*	.111*	-.008	.096*	-.024*	.006		
PRIVATE	Employed in private sector	-.029*	-.062*	-.082*	-.059*	-.054*	-.058*	-.645*	
SELFEMP	Self-employed	-.035*	-.027*	.115*	-.017*	.093*	.069*	-.140*	-.666*

Table 9. (*Continued*).

Non-Citizens

Variable	Description	LOGWAGE	EDU	LABOR	ENGLISH	MAN	MARRIED	PUBLIC	PRIVATE
LOGWAGE	Log of mean hourly wage	1.000							
EDU	Educational level achieved	.533*							
LABOR	Labor market experience	-.396*	-.694*						
ENGLISH	Speak good English	.462*	.626*	-.549*					
MAN	Male worker	.102*	.034*	.033*	.007				
MARRIED	Married with spouse present	-.018*	-.064*	.200*	-.121*	.037*			
PUBLIC	Employed in public sector	.042*	.159*	-.133*	.139*	-.008	-.015		
PRIVATE	Employed in private sector	.004	-.077*	-.003	-.056*	-.030*	-.029*	-.677*	
SELFEMP	Self-employed	-.048*	-.055*	.137*	-.064*	.048*	.055*	-.087*	-.675*

MSA-Level Correlation Matrix

Variable	Description	AVGWAGE	%BUZ	%CHINESE	%ASIAN	%NONWHITE	OCCSEG	RESISEG
AVGWAGE	Log of mean hourly wage							
%BUZ	Percent of Chinese-owned firms	.122						
%CHINESE	Percent Chinese population	.134	.961*					
%ASIAN	Percent Asian population	.232	.917*	.935*				
%NONWHITE	Percent non-White population	.044	.605*	.487*	.573*			
OCCSEG	Occupational segregation	-.305*	-.787*	-.723*	-.701*	-.514*		
RESISEG	Residential segregation	-.132	-.072	-.094	-.213	-.238*	.064	
UNEMPLOY	Unemployment rate	-.087	.086	.010	.125	.405*	.036	-.157

* $p<0.05$

elsewhere is not valued in the U.S. labor market; worse, it serves as a kind of penalty to the immigrants. The matrixes also show that the relations between earnings and the two human capital--education and language ability for the two foreign-born groups are stronger than those for the native-born group. The data for the non-citizen group show that married workers earned less than workers of other marital statuses in 1999.

Apart from the moderate collinearity among the employment sectors, the correlations among the human capital variables are relatively higher for the two foreign-born groups than those for the native-born group.

Table 10 presents the means, standard deviations, and minimum and maximum values for each measure of the MSA-level or contextual variables. The specific characteristics for each MSA were shown previously in Table 7. The percentage of Chinese-owned businesses in an MSA, which is used as proxy of social capital in the labor market, ranges from a low of 0.13 in Rochester, New York to a high of 46.10 in Honolulu, Hawaii (see Table 7). The mean value for the 70 MSAs is 5.42 percent.

Table 10. Descriptive Statistics of MSA-Level Variables

Variable	Description	Mean	Min	Max	Std D
AVGWAGE	Mean hourly wage	22.72	1.00	1,543.27	26.45
%BUZ	Percent of Chinese-owned firms	5.42	0.13	46.10	8.42
%CHINESE	Percent Chinese population	1.45	0.20	15.57	2.57
%ASIAN	Percent Asian population	5.39	1.10	46.00	6.87
%NONWHITE	Percent non-White population	35.16	10.90	80.00	16.01
RESISEG	Residential segregation	0.48	0.28	0.67	0.10
OCCSEG	Occupational segregation	0.77	0.46	0.93	0.12
UNEMPLOY	Unemployment rate	4.15	1.66	13.69	1.96
N=70					

The relative size of the Chinese population also varies greatly from MSA to MSA—from a low of 0.20 in Louisville, Kentucky to a high of 15.57 in Honolulu, Hawaii; the mean value is 1.45 percent. Similar distributions and variations are also found in the relative size of Asian American populations in the 70 metropolitan areas--a low of 1.10 in Louisville, a high of 46.00 in Honolulu, with a mean of 5.39. Ranging from 10.90 to 80.00, considerable variation also exists in the size of the non-white population across the 70 MSAs.

The index of dissimilarity is used to measure how differently Chinese and majority whites are distributed among census tracts across a metropolitan area. According to Massey and Denton (1988), a value anywhere between zero to 0.30 suggests a low degree of residential segregation, a value between 0.30 and 0.60 represents a moderate degree, and one above 0.60 a high degree. Table 10 shows that the residential indexes range from a low of 0.28 (Tacoma, WA) to a high of 0.67 (Chicago, IL), reflecting low to high degrees of segregation. The mean value of 0.48 falls in the moderate range, meaning that 48 percent of either Chinese ethnics or whites would have to exchange residence in order to approximate their percentage distributions across the census tracts in a metropolitan area in 1999. This finding is consistent with the literature. That is, the Chinese are in general moderately separated from the majority white in residence.

If the benchmark for residential segregation is applied to categorize how Chinese workers are separated occupationally from the majority whites, the indexes, from a low of 0.46 (San Francisco, CA, see Table 7) to a high of 0.93 (Louisville, KY), suggest that

Chinese are anywhere from moderately to extremely segregated from the majority whites in the labor market. A mean value of 0.77 indicates that in an average MSA 77 percent of either Chinese or whites would have to change occupational categories in order for the two groups to have identical distributions. While being consistent with the empirical literature, this finding may also suggest that the Chinese have their own labor market or niches.

The control variable--the average unemployment rate of 1998 and 199 is used to measure the economic health of a local market. It ranges from a low of 1.66 (Raleigh-Durham-Chapel Hill, NC) to a high of 13.69 (Fresno, California, see Table 7), with a mean value of 4.15.

The zero-order correlation matrix of the contextual variables is presented in the bottom panel of Table 9 and the corresponding scatterplot matrix is shown in Figure 4. The hourly wages of the individual Chinese workers at level-1 are averaged to the MSA level. The correlation matrix shows that occupational segregation is the only contextual variable that is significantly associated with mean wage earnings. It shows the expected negative association at the significance level of 0.05; an increase in occupational segregation tends to decrease the wage earnings of Chinese workers. However, occupational segregation is also significantly correlated with the percentage of Chinese-owned businesses (%BUZ, r=-0.787), the percentage of Chinese American population (%CHINESE, r=-0.723, $p<0.05$), and the percentage of Asian American population (%ASIAN, r=-0.701, $p<0.05$). The percentage of Chinese-owned business (%BUZ) is also highly positively correlated with %CHINESE (r=0.961, $p<0.05$), %ASIAN

(r=0.917, p<0.05), and %NONWHITE (r=0.605, p<0.05). The scatter plots of the contextual variables displayed in Figure 4 show that for the most part they are linearly correlated. The positive correlations between the percentage of Chinese-owned businesses and the percentage of Chinese Americans and the percentage of Asian Americans suggest that the ethnic business is taking advantage of the co-ethnics in terms of markets and sources of labor (Wilson and Portes 1980; Logan et al 1994; Wilson 2003).

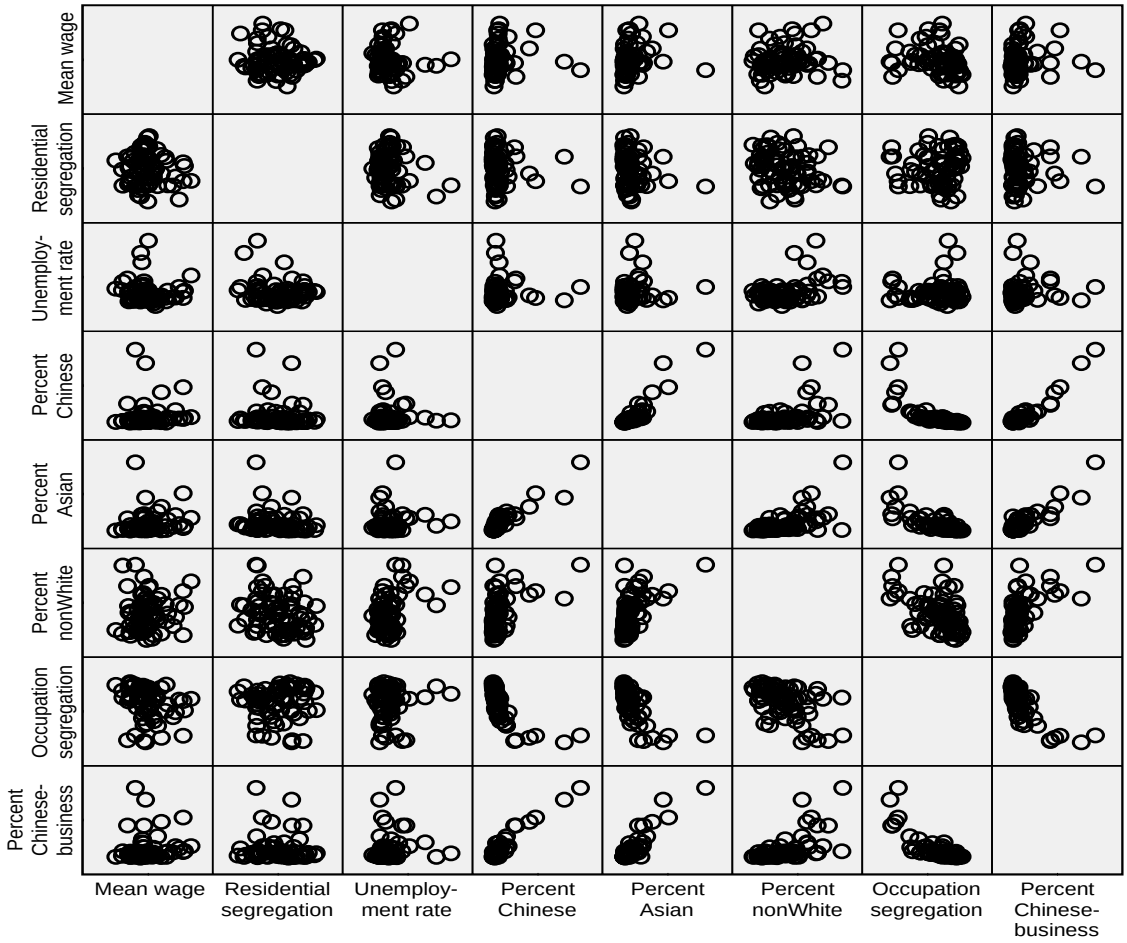

Figure 4. Scatterplot Matrix of MSA-Level Variables

The statistically significant correlations among the relative sizes of minority populations, occupational segregation, and percentage of Chinese-owned businesses suggest the existence of collinearity. In order to address the research questions on contextual characteristics stated in Chapter V, the effects of percentage of Chinese population, the percentage of Asian population, the percentage of nonwhite population, occupational segregation, and the percentage of Chinese-owned businesses, will be investigated in 5 separate models for each of the three Chinese groups.

The following section proceeds to fit two-level models to the data using HLM 6.02 (Raudenbush, Bryk, and Congdon 2005).

The Empirical Multilevel Models

An ANOVA model is the first of the two-level models to be fitted to the data. As an unconditional model, it is often referred to as one-way ANOVA with random effects and is thus the simplest model. The unconditional model is meant to determine whether there is statistically significant variation in mean wage earnings within and across MSAs. By allowing the earnings estimates to vary randomly across individual workers within an MSA and randomly across the MSAs, one can determine whether there exists statistically significant variation at the individual level and the MSA-level that might be accounted for by introducing independent variables into a full model. If there is little to no variation in the earnings among individuals across the MSAs, then adding individual-level and MSA-level predictor variables in the model will not provide additional information. And if there is statistically significant variation in the outcome, the

estimated variance component for each level may allow partitioning how much of it lies within and between MSAs.

As an unconditional model, the one-way ANOVA does not include either Level-1 or Level-2 independent variables. The first level, or the individual level, models the variation of wage earnings within the local labor market or MSA:

$$Y_{ij} = \beta_{0j} + r_{ij} \quad (1)$$

where:

Y_{ij} is the hourly wage of individual male or female worker *i* in MSA *j*;

β_{0j} is the intercept of MSA *j* from MSA-level equation (2) presented below; and

r_{ij} is an error term for each worker *i* in MSA *j*.

The second level, or MSA-level, is used to model the variation of hourly wage among MSAs using the parameters estimated for each MSA in Level-1 as outcome variables. Specifically, each MSA's average level of hourly wage, β_{0j}, is modeled first as a function of the grand mean of hourly wage plus a random error:

$$\beta_{0j} = \gamma_{00} + u_{0j} \quad (2)$$

where:

γ_{00} is the grand mean of hourly wage, and

u_{0j} is a random error, $u_{0j} \sim N(0, \tau^2)$.

Combining Equations (1) and (2) yields:

$$Y_{ij} = \gamma_{00} + u_{0j} + r_{ij}$$

This one-way ANOVA model has a grand mean γ_{00} with a MSA (Level-2) error term, u_{0j}, and an individual worker (Level-1) error term, r_{ij}.

To determine if there is any statistically significant variation among individual workers within an MSA and among the MSAs to warrant the inclusion of predictor variables, the following null hypothesis is tested using an alpha level of .05: H_0: $\tau_\beta = 0$, and H_0: $\tau_\gamma = 0$.

The results of the hypotheses tests show that the variance components of the three ANOVA models are all statistically significant. Specifically, for the native-born group, the estimated values are τ_{00}= 0.0133, σ^2= 0.4545, p=0.000. The corresponding estimated values for naturalized citizens are 0.034 and 0.597, respectively, p=0.000; the values for non-citizens are 0.040 and 0.588, respectively, p=0.000. These estimates suggest that MSAs do differ in their mean wage earnings and that there is more variation among individual workers within MSAs or local labor markets.

The ANOVA also model generates a reliability estimate for each of the group's sample means as an estimate of its true population mean. For example, the reliability estimate (λ) for the native-born group's sample mean as an indicator of the true mean for the MSAs is 0.512. The Chi-square (χ^2) test, which produces a λ value of 365, with 69 degree of freedom (df), and p=0.000, indicates the existence of variation in wage earnings among the MSAs. The test estimate for the naturalized group are: λ=0.798, χ^2= 1,738, df=69, p=0.000; and the test statistics for the non-citizen group are: λ=0,789, χ^2=2,189, df=69, p=0.000.

An intraclass variation, ρ, can be estimated to partition the sources of variation in

wage earnings (Raudensbush and Bryk 1992). For example, the ρ can be estimated for the native-born group to see what portion of the total variance occurs between MSAs:

$$\rho = \tau_{00}/(\tau_{00}+\sigma^2)$$

$$= 0.013/(0.0133+0.4545)$$

$$= 0.029$$

That is to say, about 3 percent of the total variation in wage earnings among native-born Chinese occurs between MSAs, and 97.1 percent of the variation lies at the individual level, namely, within the MSA. The ρ values for the naturalized citizen group and non-citizen group are 0.054 and 0.064, respectively.

Since the results of the ANOVA models have provided evidence of significant variation in wage earnings within and between MSAs, the models are expanded by including predictor variables in Level-1 and Level-2 equations. Specifically, Level-1 variables include the major human capital variables: educational achievement (EDU), English language ability (ENGLISH), labor market experience (LABOR), and control variables: gender (MAN), marital status (MARRIED), and class of employment (PUBLIC, PRIVATE, and SELF-EMPLOY as reference).

Level-1 is a standard individual-level OLS earnings function. The general regression equation is expressed as:

$$\begin{aligned} Y_{ij} = {} & \beta_{0j} + \beta_{1j}(EDU_{ij} - \overline{EDU}_{.j}) + \beta_{2j}(LABOR_{ij} - \overline{LABOR}_{.j}) \\ & + \beta_{3j}(ENGLISH_{ij} - \overline{ENGLISH}_{.j}) + \beta_{4j}(MAN_{ij} - \overline{MAN}_{.j}) \\ & + \beta_{5j}(MARRIED_{ij} - \overline{MARRIED}_{.j}) + \beta_{6j}(PUBLIC_{ij} - \overline{PUBLIC}_{.j}) \end{aligned}$$

$$+ \beta_{7j}(PRIVATE_{ij} - \overline{PRIVATE}_{.j}) + r_{ij}$$

where:

Y_{ij} is the hourly wage of individual worker *i* from MSA *j*;

β_{0j} is the intercept for regression of MSA *j* from the MSA-level equations as specified below;

$\beta_{1j} \ldots \beta_{7j}$ are the regression slopes associated with EDU, LABOR, ENGLISH, MAN, MARRIED, PUBLIC, and PRIVATE for worker *i* in MSA *j*, respectively;

r_{ij} is an error term for each individual worker *i* in MSA *j*, and r_{ij}: $\sim N(0,\sigma^2)$.

The independent variables in the individual-level equation have been "centered" by subtracting their values from their corresponding MSA means. In this way, β_{0j}, the intercept of a Level-2 unit (MSA), may be interpreted as the mean log hourly wage of an MSA (Arnold 1992).

The individual-level equation is first estimated separately for each of the 70 MSAs; these are referred to as within-MSA analyses. The regression coefficients for each MSA are then used as the dependent variables in the MSA-level analysis, referred to as Level-2 or between-MSA models that allow the coefficients in the individual-level earnings function to vary across MSAs.

Because of possible multicollinearity among some Level-2 variables as indicated in Table 9, the variables: %CHINESE, %ASIAN, %NONWHITE, OCCSEG, and %BUZ are introduced in separate Level-2 models that contain RESISEG (residential segregation) and UNEMPLOY (unemployment rate). To illustrate with Level-2 variables %CHINESE, RESISEG, and UNEMPLOY in the model:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{RESISEG})_j + \gamma_{02}(\text{UNEMPLOY})_j + \gamma_{03}(\%\text{CHINESE})_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{RESISEG})_j + \gamma_{12}(\text{UNEMPLOY})_j + \gamma_{13}(\%\text{CHINESE})_j + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(\text{RESISEG})_j + \gamma_{22}(\text{UNEMPLOY})_j + \gamma_{23}(\%\text{CHINESE})_j + u_{2j}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(\text{RESISEG})_j + \gamma_{32}(\text{UNEMPLOY})_j + \gamma_{33}(\%\text{CHINESE})_j + u_{3j}$$

$$\beta_{4j} = \gamma_{40} + \gamma_{41}(\text{RESISEG})_j + \gamma_{42}(\text{UNEMPLOY})_j + \gamma_{43}(\%\text{CHINESE})_j + u_{4j}$$

$$\beta_{5j} = \gamma_{50} + \gamma_{51}(\text{RESISEG})_j + \gamma_{52}(\text{UNEMPLOY})_j + \gamma_{53}(\%\text{CHINESE})_j + u_{5j}$$

$$\beta_{6j} = \gamma_{60} + \gamma_{61}(\text{RESISEG})_j + \gamma_{62}(\text{UNEMPLOY})_j + \gamma_{63}(\%\text{CHINESE})_j + u_{6j}$$

$$\beta_{7j} = \gamma_{70} + \gamma_{71}(\text{RESISEG})_j + \gamma_{72}(\text{UNEMPLOY})_j + \gamma_{73}(\%\text{CHINESE})_j + u_{7j}$$

where:

γ_{00} is the expected intercept or the mean hourly wage for MSAs;

γ_{10} , $\gamma_{20, \ldots}$ γ_{70} are the expected slopes for an MSA with values of zero on Level-2 predictor variables RESISEG, UNEMPLOYMENT, and %CHINESE, respectively;

$\gamma_{01,}$ $\gamma_{02,}$ $\gamma_{03,}$ are the regression coefficients associated with the mean values of Level-2 variables RESISEG, UNEMPLOYMENT, and %CHINESE, respectively;

$u_{0j,}$ $u_{1j,}$ $u_{2j,}$ …, u_{7j} are the unique random effects associated with MSA *j*. u_{0j}-u_{7j}:~ $N(0, \tau^2)$.

The level-2 variables are also centered around their respective grand means. The intercept derived from the centering can be interpreted as an adjusted mean for MSA *j* (Bryk and Raudenbush 1992).

Combining the MSA-level models and the individual-level model yields the integrated model:

$$
\begin{aligned}
Y_{ij} = {} & \gamma_{00} + \gamma_{01}*(\text{RESISEG})_j + \gamma_{02}*(\text{UNEMPLOY})_j + \gamma_{03}*(\%\text{CHINESE})_j \\
& + \gamma_{10}*(\text{EDU}_{ij} - \overline{\text{EDU}}_{.j}) \\
& + \gamma_{11}*(\text{RESISEG})_j\,(\text{EDU}_{ij} - \overline{\text{EDU}}_{.j}) \\
& + \gamma_{12}*(\text{UNEMPLOY})_j\,(\text{EDU}_{ij} - \overline{\text{EDU}}_{.j}) \\
& + \gamma_{13}*(\%\text{CHINESE})_j\,(\text{EDU}_{ij} - \overline{\text{EDU}}_{.j}) \\
& + \gamma_{20}*(\text{LABOR}_{ij} - \overline{\text{LABOR}}_{.j}) \\
& + \gamma_{21}*(\text{RESISEG})_j\,(\text{LABOR}_{ij} - \overline{\text{LABOR}}_{.j}) \\
& + \gamma_{22}*(\text{UNEMPLOY})_j\,(\text{LABOR}_{ij} - \overline{\text{LABOR}}_{.j}) \\
& + \gamma_{23}*(\%\text{CHINESE})_j\,(\text{LABOR}_{ij} - \overline{\text{LABOR}}_{.j}) \\
& + \gamma_{30}*(\text{ENGLISH}_{ij} - \overline{\text{ENGLISH}}_{.j}) \\
& + \gamma_{31}*(\text{RESISEG})_j\,(\text{ENGLISH}_{ij} - \overline{\text{ENGLISH}}_{.j}) \\
& + \gamma_{22}*(\text{UNEMPLOY})_j\,(\text{ENGLISH}_{ij} - \overline{\text{ENGLISH}}_{.j}) \\
& + \gamma_{33}*(\%\text{CHINESE})_j\,(\text{ENGLISH}_{ij} - \overline{\text{ENGLISH}}_{.j}) \\
& + \gamma_{40}*(\text{MAN}_{ij} - \overline{\text{MAN}}_{.j}) \\
& + \gamma_{41}*(\text{RESISEG})_j\,(\text{MAN}_{ij} - \overline{\text{MAN}}_{.j}) \\
& + \gamma_{42}*(\text{UNEMPLOY})_j\,(\text{MAN}_{ij} - \overline{\text{MAN}}_{.j}) \\
& + \gamma_{43}*(\%\text{CHINESE})_j\,(\text{MAN}_{ij} - \overline{\text{MAN}}_{.j}) \\
& + \gamma_{50}*(\text{MARRIED}_{ij} - \overline{\text{MARRIED}}_{.j}) \\
& + \gamma_{51}*(\text{RESISEG})_j\,(\text{MARRIED}_{ij} - \overline{\text{MARRIED}}_{.j}) \\
& + \gamma_{52}*(\text{UNEMPLOY})_j\,(\text{MARRIED}_{ij} - \overline{\text{MARRIED}}_{.j})
\end{aligned}
$$

$$+ \gamma_{53}*(\%CHINESE)_j\ (MARRIED_{ij} - \overline{MARRIED}_{.j})$$

$$+ \gamma_{60}*(PUBLIC_{ij} - \overline{PUBLIC}_{.j})$$

$$+ \gamma_{61}*(RESISEG)_j\ (PUBLIC_{ij} - \overline{PUBLIC}_{.j})$$

$$+ \gamma_{62}*(UNEMPLOY)_j\ (PUBLIC_{ij} - \overline{PUBLIC}_{.j})$$

$$+ \gamma_{63}*(\%CHINESE)_j\ (PUBLIC_{ij} - \overline{PUBLIC}_{.j})$$

$$+ \gamma_{70}*(PRIVATE_{ij} - \overline{PRIVATE}_{.j})$$

$$+ \gamma_{71}*(RESISEG)_j\ (PRIVATE_{ij} - \overline{PRIVATE}_{.j})$$

$$+ \gamma_{72}*(UNEMPLOY)_j\ (PRIVATE_{ij} - \overline{PRIVATE}_{.j})$$

$$+ \gamma_{73}*(\%CHINESE)_j\ (PRIVATE_{ij} - \overline{PRIVATE}_{.j})$$

$$+ u_{0j} + u_{1j}*(EDU_{ij} - \overline{EDU}_{.j}) + u_{2j}*(LABOR_{ij} - \overline{LABOR}_{.j})$$

$$+ u_{3j}*(ENGLISH_{ij} - \overline{ENGLISH}_{.j}) + u_{4j}*(MAN_{ij} - \overline{MAN}_{.j})$$

$$+ u_{5j}*(MARRIED_{ij} - \overline{MARRIED}_{.j}) + u_{6j}*(PUBLIC_{ij} - \overline{PUBLIC}_{.j})$$

$$+ u_{7j}*(PRIVATE_{ij} - \overline{PRIVATE}_{.j}) + r_{ij}$$

The equation expresses hourly wage as a function of the overall intercept γ_{00}, the main effect of RESISEG (γ_{01}), the main effect of UNEMPLOY (γ_{02}), the main effect of %CHINESE (γ_{03}), the main effects of the seven individual-level variables, and 21 cross-level interactions involving the seven individual-level variables and the three MSA-level variables, plus random errors involving MSA-level components and individual-level components.

Maximum likelihood and generalized least squares estimation procedures are used to generate the HLM coefficients and variances. The interpretation of the HLM

regression results is the same as those derived from Ordinary Least Square regression models.

An inspection of the regression coefficients generated from the regression equations will identify the relative importance of the characteristics of individuals, group, and local labor markets in their ability to explain variation in the hourly wages of individual workers.

The following section presents the HLM results of wage earnings models for the three Chinese groups: native-borns, naturalized citizens, and non-citizens.

The HLM Regression Results

The major concerns in this dissertation are to what extent human capital and MSA-level characteristics contribute to the wage earnings of Chinese workers, and to what extent the MSA characteristics mediate the earnings slopes of the human capital characteristics. As such, the following sections mainly report these findings for each of the three groups; other effects will be mentioned in passing.

Native-born Chinese

Effects of contextual characteristics. Table 11 displays the estimated gamma (γ) coefficients from the five different models for native-born Chinese workers. All of the intercepts, γ_{00}, are very close to 3. This is the log hourly wage for a Chinese worker when he or she has average values for all the independent variables. The dependent variable was measured as the natural log of hourly wage. Generally the percent change in the wage earnings associated with the change in an independent variable is given by:

Table 11. Estimated Effects of Individual and Contextual Characteristics on Wage Earnings of Native-Born Chinese, 1999

Fixed Effect	Model 1	Model 2	Model 3	Model 4	Model 5
ON INTERCEPT1, β_0					
INTERCEPT2, γ_{00}	2.966*	2.966*	2.968*	2.950*	2.964*
RESISEG, γ_{01}	0.027	0.062	0.019	-0.024	0.014
UNEMPLOY, γ_{02}	-0.004	-0.005	-0.007	-0.003	-0.005
%CHINESE, γ_{03}	0.009				
%ASIAN, γ_{04}		0.004			
%NONWHITE, γ_{05}			0.001		
OCCSEG, γ_{06}				-0.440*	
%BUZ, γ_{07}					0.326
On EDU slope, β_1					
INTERCEPT2, γ_{10}	0.245*	0.246*	0.239*	0.227*	0.244*
RESISEG, γ_{11}	0.080	0.043	0.114	0.125	0.099
UNEMPLOY, γ_{12}	0.009*	0.010*	0.011*	0.008	0.010*
%CHINESE, γ_{13}	-0.003				
%ASIAN, γ_{14}		-0.001			
%NONWHITE, γ_{15}			-0.000		
OCCSEG, γ_{16}				-0.032	
%BUZ, γ_{17}					-0.078
On LABOR slope, β_2					
INTERCEPT2, γ_{20}	0.010*	0.010*	0.010*	0.009*	0.010*
RESISEG, γ_{21}	0.010	0.007	0.011	0.016	0.011
UNEMPLOY, γ_{22}	0.000	0.001	0.001	0.000	0.001
%CHINESE, γ_{23}	-0.000*				
%ASIAN, γ_{24}		-0.000*			
%NONWHITE, γ_{25}			-0.000		
OCCSEG, γ_{26}				0.003	
%BUZ, γ_{27}					-0.010*
On ENGLISH slope, β_3					
INTERCEPT2, γ_{30}	0.145*	0.131*	0.065	0.028	0.115
RESISEG, γ_{31}	0.114	0.271	-0.325	-0.503	-0.044
UNEMPLOY, γ_{32}	-0.001	-0.003	-0.047*	-0.006	-0.003
%CHINESE, γ_{33}	0.014				
%ASIAN, γ_{34}		0.008			
%NONWHITE, γ_{35}			0.011*		
OCCSEG, γ_{36}				-0.921*	
%BUZ, γ_{37}					0.655
On MAN slope, β_4					
INTERCEPT2, γ_{40}	0.153*	0.154*	0.160*	0.180*	0.154*
RESISEG, γ_{41}	-0.523*	-0.552*	-0.521*	-0.448*	-0.510*
UNEMPLOY, γ_{42}	-0.005	-0.004	0.001	-0.004	-0.004
%CHINESE, γ_{43}	-0.002				
%ASIAN, γ_{44}		-0.001			
%NONWHITE, γ_{45}			-0.001		
OCCSEG, γ_{46}				0.184	
%BUZ, γ_{47}					-0.069

Table 11. (*Continued*).

Fixed Effect	Model 1	Model 2	Model 3	Model 4	Model 5
On MARRIED slope, β_5					
INTERCEPT2, γ_{50}	0.160*	0.148*	0.143*	0.161*	0.160*
RESISEG, γ_{51}	-0.164	-0.109	-0.131	-0.148	-0.160
UNEMPLOY, γ_{52}	-0.003	-0.004	-0.008	-0.003	-0.003
%CHINESE, γ_{53}	-0.001				
%ASIAN, γ_{54}		0.001			
%NONWHITE, γ_{55}			0.001		
OCCSEG, γ_{56}				0.025	
%BUZ, γ_{57}					-0.024
On PUBLIC slope, β_6					
INTERCEPT2, γ_{60}	-0.071	-0.054	-0.078	-0.162*	-0.083
RESISEG, γ_{61}	-0.014	-0.005	-0.052	-0.358	-0.058
UNEMPLOY, γ_{62}	0.041	0.039	0.022	0.037	0.038
%CHINESE, γ_{63}	0.010				
%ASIAN, γ_{64}		0.003			
%NONWHITE, γ_{65}			0.003		
OCCSEG, γ_{66}				-0.698*	
%BUZ, γ_{67}					0.375
On PRIVATE slope, β_7					
INTERCEPT2, γ_{70}	0.018	0.041	0.008	-0.098	0.006
RESISEG, γ_{71}	-0.210	-0.322	-0.196	-0.412	-0.205
UNEMPLOY, γ_{72}	0.022	0.023	0.013	0.017	0.020
%CHINESE, γ_{73}	0.002				
%ASIAN, γ_{74}		-0.001			
%NONWHITE, γ_{75}			0.001		
OCCSEG, γ_{76}				-0.649*	
%BUZ, γ_{77}					0.149

* p<0.05

100*($e^{coefficient}$-1). However, because most of the relevant coefficients are very small, the original estimated coefficients shown in the table are used to approximate the percentage change in the wage earnings associated with change in the values of the independent variables.

This dissertation hypothesizes that the relative sizes of Chinese Americans, Asian Americans, nonwhites, respectively, and the social capital measured as the percentage of

Chinese-owned businesses in an MSA, are all positively related to the wage earnings of Chinese workers, whereas segregation in both occupation and residence from the majority whites is expected to have negative effects, independent of other factors.

However, of the 7 MSA-level variables, only the effect of occupational segregation (OCCSEG, Model 4) is significant at the level of 0.05. It is negatively related to wage earnings, with γ_{06}= -0.440, p< 0.05. That is to say, for each 0.01 increment in the occupational segregation from white workers, the hourly wage of Chinese workers is decreased on average by 44 percent, other things being equal. This statistically significant effect supports the research hypothesis.

Although the relative sizes of Chinese Americans (γ_{03}), Asian Americans (γ_{04}), and nonwhites (γ_{05}), and the percentage of Chinese-owned businesses (γ_{07}), are all positively related to the log of hourly wage as hypothesized, the effects are not statistically significant at the 0.05 level. Residential segregation (γ_{01}) also does not appear to show any effect on earnings attainment.

Effects of human capital characteristics. This dissertation hypothesizes that human capital characteristics—education achievement, labor market experience, and English proficiency, make positive contributions to the earnings attainment of Chinese workers. In general, this hypothesis receives support from the HLM regression results. Specifically, Table 11 shows that education is positively associated with wage earnings across the five models. For each higher level of schooling completed, there is a tendency for the wage earnings to increase on average by around 24 percent (γ_{10}). The positive effects of labor market experience on wage earnings are found to be very similar across

the five models (γ_{20}= 0.010, p< 0.05). Although low, there is a tendency for the hourly wage of an individual worker to increase on average by 1 percent with each additional year in the labor market.

The effects of language ability (γ_{30}) on the wage earnings of native-born Chinese workers are found to be statistically significant only in Models 1 and 2. A good command of English language is positively related to wage earnings. Specifically, a native-born Chinese worker who can speak good English tends to earn 13-14 percent more than those who cannot speak good English, or do not speak English at all. The hypothesis is partially supported.

The HLM results also indicate that male workers (γ_{40}) tend to earn more than female workers; and married individuals (γ_{50}) enjoy higher wage earnings than people of other marital statuses. Except for in Model 4, employment in either public or private sector does not show any statistically significant effect on the wage earnings of native-born Chinese workers.

Cross-level interaction effects. It is assumed that MSA-level characteristics transfer their effects on wage earnings through personal characteristics. The estimated gamma coefficients in Table 11 show that occupational segregation not only imposes direct effects on earnings, but also transfers its effects onto the economic outcomes through individual characteristics. For example, occupational segregation (OCCSEG) tends to have a very strong negative impact on the slope of ENGLISH on wage earnings (γ_{36}= -0.921, p< 0.05). That means an MSA with a higher level of occupational segregation tends to have steeper negative English-wage slopes for the native-born

Chinese workers than MSAs with a lower level of segregation. For each 0.01 increase of an MSA's occupational segregation between Chinese workers and white workers, the slope of English on the wage earnings of native-born Chinese workers in that area is decreased on average by 92 percent. This suggests the existence of an ethnic market or niche that takes advantage of the co-ethnic labor.

While the relative size of Chinese American population (γ_{23}=-0.000, $p < 0.05$) and that of Asian American population (γ_{24}= -0.000, $p < 0.05$) show significant but almost negligible and negative effects on the LABOR-LOGWAGE slope, the percentage of nonwhite population (γ_{35}=0.011, $p < 0.05$) tends to show a positive effect on the earnings slope of English.

The percentage of Chinese-owned businesses is also negatively related to LABOR-wage slope (γ_{27}=-0.010, $p < 0.05$) in Model 5. That is to say, each 1-unit increment in the percentage of Chinese-owned businesses is expected to reduce the LABOR-LOGWAGE slopes of native-born Chinese workers by 1 percent.

Naturalized Citizens

Table 12 presents the estimated effects or gamma (γ) coefficients of individual and contextual characteristics on the wage earnings attainment of foreign-born Chinese who were U.S. citizens via naturalization.

Effects of contextual characteristics. Group social capital (proxied by percentage of Chinese-owned businesses) and the relative sizes of minority populations were hypothesized to make positive contributions to the earnings attainment of Chinese

Table 12. Estimated Effects of Individual and Contextual Characteristics on Wage Earnings of Naturalized Citizens, 1999

Fixed Effect	Model 1	Model 2	Model 3	Model 4	Model 5
ON INTERCEPT1, β_0					
INTERCEPT2, γ_{00}	2.817*	2.816*	2.817*	2.813*	2.817*
RESISEG, γ_{01}	-0.048	-0.003	-0.040	-0.036	-0.049
UNEMPLOY, γ_{02}	-0.021*	-0.022*	-0.023*	-0.020*	-0.022*
%CHINESE, γ_{03}	0.003				
%ASIAN, γ_{04}		0.004			
%NONWHITE, γ_{05}			0.001		
OCCSEG, γ_{06}				-0.341	
%BUZ, γ_{07}					0.117*
On EDU slope, β_1					
INTERCEPT2, γ_{10}	0.206*	0.204*	0.204*	0.217*	0.209*
RESISEG, γ_{11}	-0.071	-0.128*	-0.088	-0.047	-0.067
UNEMPLOY, γ_{12}	-0.007*	-0.005	0.004	-0.001	-0.004*
%CHINESE, γ_{13}	-0.006*				
%ASIAN, γ_{14}		-0.002*			
%NONWHITE, γ_{15}			-0.001*		
OCCSEG, γ_{16}				0.157*	
%BUZ, γ_{17}					-0.183*
On LABOR slope, β_2					
INTERCEPT2, γ_{20}	0.004*	0.004*	0.005*	0.005*	0.005*
RESISEG, γ_{21}	0.006	0.004	0.006	0.007	0.006
UNEMPLOY, γ_{22}	-0.000	-0.000	0.000	-0.000	-0.000
%CHINESE, γ_{23}	-0.000				
%ASIAN, γ_{24}		-0.000*			
%NONWHITE, γ_{25}			-0.000		
OCCSEG, γ_{26}				0.005	
%BUZ, γ_{27}					-0.005
On ENGLISH slope, β_3					
INTERCEPT2, γ_{30}	0.234*	0.242*	0.227*	0.209*	0.228*
RESISEG, γ_{31}	0.414*	0.421*	0.427*	0.367*	0.410*
UNEMPLOY, γ_{32}	0.018	0.017	0.012	0.015	0.017
*CHINESE, γ_{33}	0.003				
%ASIAN, γ_{34}		0.000			
%NONWHITE, γ_{35}			0.001		
OCCSEG, γ_{36}				-0.172	
%BUZ, γ_{37}					0.123
On MAN slope, β_4					
INTERCEPT2, γ_{40}	0.200*	0.197*	0.178*	0.214*	0.200*
RESISEG, γ_{41}	-0.136	-0.195	-0.165	-0.126	-0.145
UNEMPLOY, γ_{42}	-0.028*	-0.025*	-0.025*	-0.021*	-0.024*
%CHINESE, γ_{43}	-0.007*				
%ASIAN, γ_{44}		-0.002			
%NONWHITE, γ_{45}			0.000		
OCCSEG, γ_{46}				0.173	
%BUZ, γ_{47}					-0.168

Table 12. (*Continued*).

Fixed Effect	Model 1	Model 2	Model 3	Model 4	Model 5
On MARRIED slope, β_5					
INTERCEPT2, γ_{50}	0.087*	0.094*	0.077*	0.090*	0.094*
RESISEG, γ_{51}	0.046	0.028	0.040	0.037	0.038
UNEMPLOY, γ_{52}	-0.018	-0.016	-0.020	-0.016	-0.015
%CHINESE, γ_{53}	-0.003				
%ASIAN, γ_{54}		-0.000			
%NONWHITE, γ_{55}			0.001		
OCCSEG, γ_{56}				0.022	
%BUZ, γ_{57}					-0.085
On PUBLIC slope, β_6					
INTERCEPT2, γ_{60}	0.085*	0.108*	0.116*	0.080	0.084*
RESISEG, γ_{61}	0.288	0.382	0.431	0.339	0.306
UNEMPLOY, γ_{62}	0.037	0.031	0.031	0.028	0.032
%CHINESE, γ_{63}	0.007				
%ASIAN, γ_{64}		-0.000			
%NONWHITE, γ_{65}			-0.001		
OCCSEG, γ_{66}				-0.129	
%BUZ, γ_{67}					0.188
On PRIVATE slope, β_7					
INTERCEPT2, γ_{70}	0.106*	0.113*	0.100*	0.115*	0.110*
RESISEG, γ_{71}	-0.093	-0.157	-0.085	-0.074	-0.089
UNEMPLOY, γ_{72}	0.001	0.002	0.006	0.006	0.005
%CHINESE, γ_{73}	-0.006				
%ASIAN, γ_{74}		-0.004			
%NONWHITE, γ_{75}			-0.001		
OCCSEG, γ_{76}				0.142	
%BUZ, γ_{77}					-0.199

* $p<0.05$

workers, while both occupational and residential segregations from the majority whites are expected to depress their earnings.

Table 12 shows that the grand mean for the group is around 2.8, the log hourly wage for a naturalized Chinese worker with average values for all the independent variables. It is slightly lower than that of native-born Chinese workers, an expected result.

The percentage of Chinese-owned businesses (γ_{07}=0.117, p <0.05) is positively related to the wage earnings of naturalized Chinese workers. That means there is a tendency for the hourly wage of the Chinese to increase by about 12 percent with each unit increment in the percentage of Chinese-owned businesses in a local labor market. This statistically significant effect supports the related hypothesis.

Table 12 also shows that unemployment rate (γ_{02}) is negatively associated with earnings. Each unit increase in the unemployment rate tends to reduce the hourly wage of naturalized Chinese workers by about 2 percent. The negative effect is statistically significant at the level of 0.05.

Other contextual variables do not seem to show any direct effects on the wage earnings of naturalized Chinese workers.

Effects of human capital characteristics. As expected, the three human capital characteristics all show positive effects on the wage earnings attainment of naturalized Chinese workers. Specifically, each higher level of education achieved tends to increase the hourly wage of a Chinese worker by about 20 percent; each additional year in the labor market is expected to raise the wage of the worker by 0.4 or 0.5 percent; and those workers who speak good English tend to earn at least 20 percent more than those who do not speak good English, or do not speak English at all. These statistically significant findings all lend support to the hypothesis as discussed earlier.

Regarding the control variables, male workers (γ_{40}) tend to earn about 20 percent more than female workers; married individuals (γ_{50}) are likely to earn about 9 percent than people of other marital statuses. The HLM results also show that naturalized

workers employed in both the public (γ_{60}) and private sectors (γ_{70}) tend to earn more than those self-employed individuals

Cross-level interaction effects. Table 12 shows that the EDU-LOGWAGE slope is subject to the influences of several MSA-level characteristics. Specifically, the percentage of Chinese American population (γ_{13}= -0.006, $p<0.05$), the percentage of Asian American population (γ_{14}=-0.002, $p< 0.05$), the percentage of nonwhite population (γ_{15}=-0.001, $p< 0.05$), and the percentage of Chinese-owned businesses (γ_{17}=-0.183, $p< 0.05$) are all found to impose negative effects on their respective earnings slope whereas occupational segregation (γ_{16}=0.157, $p< 0.05$) is likely to have a larger positive effect on the earnings slope. The positive effect of occupational segregation could result from the concentration of the highly educated Chinese workers in some high paying occupations. Perhaps this is a group of immigrant Chinese with U.S. citizenship, which allows them to have more opportunities in a larger society.

Residential segregation is also found to have large effects on the ENGLISH-LOGWAGE slope (γ_{31}). Specifically, each 0.01 increment in the segregation index is likely to increase the slope by around 40 percent. This means that in a segregated ethnic world, good command of English is valuable in making money.

Non-U.S. Citizen Chinese

Table 13 presents the estimated effects of the individual and contextual characteristics on the wage earnings attainments of foreign-born Chinese workers who were not U.S. citizens.

Table 13. Estimated Effects of Individual and Contextual Characteristics on Wage Earnings of Non-U.S. Citizen Chinese, 1999

Fixed Effect	Model 1	Model 2	Model 3	Model 4	Model 5
ON INTERCEPT1, β_0					
INTERCEPT2, γ_{00}	2.677*	2.675*	2.675*	2.674*	2.677*
RESISEG, γ_{01}	-0.383	-0.380	-0.373	-0.341	-0.372
UNEMPLOY, γ_{02}	-0.025*	-0.024*	-0.021	-0.025*	-0.023*
%CHINESE, γ_{03}	-0.014				
%ASIAN, γ_{04}		-0.002			
%NONWHITE, γ_{05}			-0.001		
OCCSEG, γ_{06}				-0.042	
%BUZ, γ_{07}					-0.441
On EDU slope, β_1					
INTERCEPT2, γ_{10}	0.143*	0.142*	0.136*	0.143*	0.144*
RESISEG, γ_{11}	0.017	-0.021	0.015	0.027	0.022
UNEMPLOY, γ_{12}	-0.006*	-0.006*	-0.002	-0.003	-0.003
%CHINESE, γ_{13}	-0.005*				
%ASIAN, γ_{14}		-0.002*			
%NONWHITE, γ_{15}			-0.001		
OCCSEG, γ_{16}				0.078	
%BUZ, γ_{17}					-0.149*
On LABOR slope, β_2					
INTERCEPT2, γ_{20}	-0.000	-0.000	-0.000	0.000	-0.000
RESISEG, γ_{21}	0.003	-0.002	0.002	0.005	0.003
UNEMPLOY, γ_{22}	-0.000	-0.000	0.001	0.000	0.000
%CHINESE, γ_{23}	-0.001*				
%ASIAN, γ_{24}		-0.000*			
%NONWHITE, γ_{25}			-0.000		
OCCSEG, γ_{26}				0.011	
%BUZ, γ_{27}					-0.017*
On ENGLISH slope, β_3					
INTERCEPT2, γ_{30}	0.347*	0.362*	0.379*	0.387*	0.359*
RESISEG, γ_{31}	-0.308	-0.345	-0.297	-0.261	-0.315
UNEMPLOY, γ_{32}	0.007	0.006	0.024	0.013	0.010
%CHINESE, γ_{33}	-0.002				
%ASIAN, γ_{34}		-0.003			
%NONWHITE, γ_{35}			-0.003*		
OCCSEG, γ_{36}				0.242	
%BUZ, γ_{37}					-0.172
On MAN slope, β_4					
INTERCEPT2, γ_{40}	0.142*	0.140*	0.138*	0.144*	0.141*
RESISEG, γ_{41}	-0.124	-0.074	-0.101	-0.127	-0.125
UNEMPLOY, γ_{42}	-0.015	-0.016	-0.025*	-0.017	-0.018*
%CHINESE, γ_{43}	0.005				
%ASIAN, γ_{44}		0.002			
%NONWHITE, γ_{45}			0.001		
OCCSEG, γ_{46}				0.054	
%BUZ, γ_{47}					0.130

Table 13. (*Continued*).

Fixed Effect	Model 1	Model 2	Model 3	Model 4	Model 5
On MARRIED slope, β_5					
INTERCEPT2, γ_{50}	0.077*	0.073*	0.073*	0.087*	0.080*
RESISEG, γ_{51}	-0.060	-0.090	-0.042	-0.045	-0.073
UNEMPLOY, γ_{52}	-0.021*	-0.020	-0.017	-0.018	-0.018
%CHINESE, γ_{53}	-0.005				
%ASIAN, γ_{54}		-0.001			
%NONWHITE, γ_{55}			-0.001		
OCCSEG, γ_{56}				0.124	
%BUZ, γ_{57}					-0.163
On PUBLIC slope, β_6					
INTERCEPT2, γ_{60}	-0.081	-0.082	-0.050	-0.121*	-0.095*
RESISEG, γ_{61}	0.044	0.206	0.064	0.048	0.043
UNEMPLOY, γ_{62}	0.071*	0.069*	0.062	0.051	0.052
%CHINESE, γ_{63}	0.031*				
%ASIAN, γ_{64}		0.013*			
%NONWHITE, γ_{65}			0.002		
OCCSEG, γ_{66}				-0.663*	
%BUZ, γ_{67}					0.987*
On PRIVATE slope, β_7					
INTERCEPT2, γ_{70}	0.090*	0.082*	0.103*	0.122*	0.098*
RESISEG, γ_{71}	-0.000	-0.015	0.010	0.066	0.004
UNEMPLOY, γ_{72}	-0.036*	-0.036*	-0.026	-0.029	-0.033*
%CHINESE, γ_{73}	-0.004				
%ASIAN, γ_{74}		-0.000			
%NONWHITE, γ_{75}			-0.002		
OCCSEG, γ_{76}				0.252	
%BUZ, γ_{77}					-0.177

* p<0.05

Effects of contextual characteristics. The main effects of the contextual variables are given in the top panel of Table 13. The grand mean (γ_{00}) of the log hourly wage is around 2.7 and is slightly lower than those of native-born and naturalized Chinese workers. Except for in Model 3, the unemployment rate (γ_{02}) is the only variable that is statistically significant at the level of 0.05. Like the models for the other two Chinese groups shown previously, the models for non-U.S. citizen Chinese workers show that the

unemployment rate is negatively related to wage earnings. Each 1-unit increment in the rate tends to bring down the hourly wage on average by about 2 percent.

Table 13 shows that both the main effects of percentage of Chinese Americans (γ_{03}=-0.014), the percentage of Asian American population (γ_{04}=-0.002), the percentage of nonwhite population (γ_{05}=-0.001), and occupational segregation (γ_{06}= -0.042) are all negatively related to the wage earnings of non-U.S. citizen Chinese workers. But the effects, which are counter to the hypotheses, are not statistically significant at the level of 0.05. The percentage of Chinese-owned businesses shows a negative but not statistically significant effect on the earnings of non-U.S. citizen Chinese workers. The related hypothesis is also not supported.

Effects of human capital characteristics. Educational attainment (γ_{10}) and the ability to speak good English (γ_{30}) are the two human capital variables that show strong positive effects on the wage earnings of non-U.S. citizen Chinese workers. Specifically, each higher level of schooling achieved is likely to increase the hourly wage of an average Chinese worker by at least 14 percent; those who can speak good English tend to earn at least 35 percent more than those who cannot speak proficient English or simply do not speak the language. Both effects are statistically significant and support the related hypothesis.

However, labor market experience (γ_{20}) shows negligible and non-significant effects on the earnings attainment of non-U.S. citizen Chinese workers. This suggests that Chinese workers probably failed to transfer the labor market experience they accumulated outside the United States to the host labor market.

Similar to the last two groups, male workers (γ_{40}) in this group also tend to earn more than their female counterparts; married individuals (γ_{50}) are likely to enjoy higher wage than people of other marital statuses. However, compared to the other two groups, the wage rates for this group are lower.

Chinese workers in the public sector (γ_{60}) are shown to earn less than their self-employed counterparts, but the depressing effects are statistically significant only in Models 4 and 5. Employment in the private sector (γ_{70}) is likely to increase the hourly wage of non-U.S. citizen Chinese workers by around 9 percent.

Cross-level interaction effects. The estimated gamma coefficients in Table 13 show that the percentage of Chinese Americans (γ_{13}=-0.005, $p < 0.05$), the percentage of Asian American population (γ_{14}=-0.002, $p < 0.05$), and the percentage of Chinese-owned businesses (γ_{17}=-0.149, $p < 0.05$) all tend to have adverse effects on the education-earnings slopes. The gamma values indicate that increasing Chinese ethnic population and/or Asian population in a local market tends to depress the slope of education on wage earnings of non-U.S. citizen Chinese workers, though the effects are very trivial; and that for each 1-unit increment in the percentage of Chinese-owned businesses, the slope of educational attainment on hourly wage earnings for non-U.S. citizen Chinese workers is decreased on average by about 15 percent.

The above three contextual variables have similar effects on the labor-wage slopes, though at smaller magnitudes: γ_{23}= -0.001, γ_{24}=-0.000, γ_{27}=-0.017, $p<0.05$, respectively.

The above results suggest that recent immigrants with education and labor

market experience probably obtained in their home country fail to transfer their investment to earnings in a labor market with increasing ethnic population and ethnic-owned businesses. These findings contradict the hypothesis that predicts a positive effect on earnings.

The unemployment rate is found to have indirect effects on wage earnings. Higher unemployment rate tends to depress the slopes of EDU (γ_{12}), MAN (γ_{42}), and PRIVATE (γ_{72}) on earnings. However, when those working in the private sector suffer losses in earnings from increasing unemployment rate, there is tendency for a non U.S.-citizen Chinese employed in a public sector (γ_{62}) to earn more than his or her self-employed counterparts. This suggests that public sector can be a safety haven for recent immigrants in time of poor economics.

Having presented the results from fitting the multilevel models to the data, the following chapter summarizes the findings, discusses the strengths, limitations of the study, and issues for future study.

CHAPTER VIII

CONCLUSIONS

This chapter begins with a summary of the findings presented in Chapter VII. Specifically, it sums up findings regarding the direct effects of individual and contextual characteristics as well as the mediating effects of the contextual factors on the wage earnings of Chinese in the United States. Following the summary is a discussion of the strengths, limitations of the study. The chapter concludes with a brief discussion of issues for future study.

Summary of Findings

The objective of this dissertation is to identify the factors at both individual and MSA levels that may affect the wage earnings attainments of Chinese workers in the U.S. labor market. The major individual-level characteristics include educational achievement, labor market experience, and English language ability; the MSA-level or contextual factors include racial composition (percentage of Chinese Americans, percentage of Asian Americans, and percentage of nonwhites), percentage of Chinese-owned businesses (as proxy of social capital), occupational and residential segregation between Chinese and majority whites, and unemployment rate in the labor market as control.

Using HLM techniques and the combined data of 1 percent and 5 percent 2000 PUMS files for 70 MSAs where at least 50 civilian Chinese workers of aged 25-64 resided, this dissertation integrates the two research traditions—individualistic and

structural approaches to address the above concerns. Even though the ANOVA results indicate that most of the variation in wage earnings occurs at the individual level or within MSAs, there is significant variation between the MSAs. The following is a summary of the findings from the five different earnings models for each of the three Chinese groups classified according to their nativity and citizenship.

Individual Characteristics

The individual characteristics examined in this dissertation—education attainment, labor market experience, and English language proficiency--are mainly components of human capital. The human capital theory assumes that more investment in human capital will bring one higher returns in the labor market. Education is a major form of human capital. It is not only a key indicator of socioeconomic achievement but also an investment that affects subsequent economic outcomes in the labor market. For minorities and immigrants, education serves as a major tool for moving upward in the socioeconomic ladder. The fitted models indicate that education does play an important role in improving the wage earnings of the three groups of Chinese workers in the U.S. labor market. However, the returns to investment in the human capital vary among the three groups of Chinese. Specifically, the return to education for the native-born group members is the highest (23%) and that for the foreign-born non-U.S. citizens the lowest (14%). These findings are consistent with findings in the empirical literature.

The human capital theory holds that acquiring majority language fluency may be viewed as a human capital investment because the ability to communicate tends to enhance potential production in the labor market (McManus et al. 1983; Carliner 1981).

It is therefore expected that investment in a host country's language should increase the potential earnings of minority workers.

The HLM regression results show that investment in English language does increase earnings and that the returns to the investment vary across the three Chinese groups. For the native-borns--98 percent of whom speak good English, speaking proficient English means 13-14 percent higher hourly wage than for those poor or non-English speakers. For foreign-born Chinese who have obtained their citizenship via naturalization, a good command of English means at least a 20 percent higher wage compared to poor or non-English speakers; and for foreign-born non-U.S. citizens who are most likely recent immigrants, the language effect is dramatic: 35 percent higher for good English speakers than for poor or non-English users.

As a component of human capital, labor market experience also shows mixed effects on the wage earnings of Chinese workers. Although generally low, labor market experience has positive effects on earnings of both native-born and naturalized Chinese. However, it does not show any effects on the wage earnings of foreign-born non-U.S. citizens who are generally recent immigrants. That is to say, the labor force experience accumulated outside the United States, regardless of the amount, does not seem to bring any benefits to new immigrants. Actually, this finding is consistent with the empirical literature. Because the return to foreign work experience is very low, recent immigrants often have to forgo their previously obtained experience and begin from scratch in order to survive in the new society (Friedberg 2000).

Without doubt, the above findings are generally consistent with the human

capital literature. If the three groups of Chinese--native-borns, naturalized citizens, and non-U.S. citizens, are used to measure the degree of assimilation as implied by the time they have spent in the United States, the varying returns to groups of different immigration history clearly support the assimilation perspective. The findings are consistent with the general assimilation literature which finds that the partial effects of human capital on earnings are relatively lower for foreign-born. With time in the United States, they often overcome problems of language, culture, unfamiliarity with American customs and the labor market, possible discrimination, and mismatches between their education, work experience, and jobs skills obtained at their home country and those required in the U.S. labor market. Their earnings profile should become relatively steeper and may eventually reach parity with their native-born counterparts or even the majority group (Chiswick 1978, 1980; Nee and Sanders 1985).

Other individual characteristics were also found to play important roles in the earnings equation. Male workers are likely to earn at least 14 percent more than their female counterparts; married individuals tend to have hourly wages higher than people of other marital statuses. Only those naturalized workers in both public and private sectors enjoy higher wages than those self-employed individuals; and non-U.S. citizens find it more profitable to work in the private sector than being self-employed. Employment in both public and private sectors does not seem to have any effect different from self-employment for native-born Chinese workers. Probably their fuller assimilation into the mainstream society presents fewer obstacles in earning a living.

The above analysis indicates that earnings attainment of Chinese workers is

generally improved with increased educational level, a good command of English, and the length of stay in the United States. These results provide support for both human capital and assimilation theories, suggesting that achieved characteristics make important contribution to the economic well-being of individual Chinese Americans.

Contextual Characteristics

The other major concern of this dissertation is the impact of ethnic group and labor market characteristics on earnings attainment. Various structural variables have been shown in the literature to affect racial differentiation in earnings. These include racial composition, group social capital measured as percentage of ethnic-owned businesses, occupational and residential segregation from the majority whites, just to name a few. This dissertation hypothesized that an expanding minority population not only increases its negotiating power in the labor market but also gives rise to its ethnic businesses in terms of co-ethnic labor supply and patronage. It follows that increases in minority population and ethnic-owned businesses should contribute to the earnings attainment of the minority workers. This study also expected that in places where the occupational disparities of two races are smaller, occupational segregation and occupational inequality should be less pronounced, hence, less earnings inequality. Finally, residential differences were hypothesized to also affect patterns of inequality.

Of the 7 MSA-level or contextual characteristics examined in this dissertation, three show significant direct effects on the economic outcomes of individual workers in certain group(s): 1) occupational segregation from majority whites tends to impose a strong and negative effect on the earnings attainment of the native-born Chinese

workers--as much as 44 percent decrease in hourly wage is associated with each 0.01 increase in the segregation index. This group of Chinese workers may be disadvantaged because of unequal opportunities to participate in the more dynamic, more protected, or more rewarded segments of the American economy; 2) increasing percentage of Chinese-owned businesses tends to increase the earnings attainment of naturalized Chinese workers; 3) the unemployment rate is likely to depress the wage earnings of the two foreign-born groups but not the native-borns. This suggests that Chinese workers with a different immigration history face the labor market differently.

The above three MSA-level variables not only impact earnings attainment directly but also indirectly via different individual characteristics. For example, an additional 0.01 increase in an MSA's occupational segregation between Chinese workers and white workers tends to decrease the slope of English on wage earnings of native-born Chinese workers by 92 percent; it will, however, increase the earnings slope of education for naturalized citizens by about 16 percent. The positive effect on the education-earnings slope could have resulted from a heavy concentration of highly educated immigrants in some high paying occupations. The concentration represents the effect of the 1965 Immigration Act which stresses occupational preference for admissions one the one hand and the brain drain from the sending countries on the other.

Group social capital, which is proxied by percentage of Chinese-owned businesses in an MSA, also shows indirect effects on the earnings attainment of Chinese workers through human capital characteristics. However, contrary to the hypothesis, an increase in ethnic-owned businesses tends to depress the earnings slopes of labor market

experience for native-born workers and non-citizens slightly and hold down the slopes of education for non-citizens and naturalized citizens relatively heavily. This seems to support Hirschman and Wong's (1984) speculation that the maintenance of ethnic ghettos is to blame for the low returns among Chinese workers.

The unemployment rate, which is used to gauge the health of local labor market conditions, is also found to have indirect effects on the education-earnings slope for the native-born Chinese workers in some models. The effects are positive but minor. Some models show that the effects for the foreign-born workers are negative but negligible.

According to the discrimination thesis, a greater representation of a minority group leads to greater earnings discrimination against that minority in the labor market. Previous research inferred earnings discrimination from the negative effect of the relative size of minority or non-whites on earnings. Some studies further point out that, only those groups that threaten the economic advantage of the majority group would suffer from earnings discrimination in the labor market (Cassirer 1996). Following this theory, it is expected that increasing representation of Chinese/Asian population will depress their earnings attainment in the labor market. However, the relative sizes of Chinese, Asian Americans, and nonwhites, respectively, do not seem to show any significant and direct effects on the wage earnings of Chinese workers. But that does not mean that they have no impacts at all; actually, they do have indirect impacts on the earnings slopes of individual factors. For example, the relative sizes of minority populations are found to impose indirect effects on the slopes of education for naturalized Chinese. Although the effects are negative and trivial, they do exist. This

suggests that Chinese immigrants failed to convert their educational attainment into earnings advantage in a labor market with increasing ethnic population.

Similarly, although residential segregation from the white population does not seem to show any direct effect on the wage earnings of Chinese workers, it does affect their economic outcomes indirectly. It has a steep negative earnings slope for native-born male workers. Specifically, an average male worker in a highly segregated residence tends to earn at least 45 percent less than his female counterparts. Most likely native-born Chinese males are easily trapped in an ethnic ghetto whereas female can move out by out-marriage.

The above findings suggest that contextual characteristics do not necessarily impose direct effects on earnings; they may transfer their varying effects onto earnings via individual characteristics. This is consistent with the empirical literature in general.

Strengths, Limitations, and Future Study

As indicated in the review of the earnings attainment literature, while much attention has been paid to the roles of either individual characteristics or macro-level factors per se, little attention has been given to how they together operate to determine the earnings of individuals.

The human capital model and the structural approach are two distinct research traditions in the analysis of earnings attainment. These two approaches address essentially the same question but take quite different and sometimes conflicting views of earnings determination. Human capital focuses on personal "quality" differences while generally assuming a homogeneous labor market throughout the country. The structural

approach seldom regards individual differences as sources of earnings inequality and instead stresses contextual characteristics. Each approach alone provides insight into the earnings mechanism, yet each cannot give a complete account of the differentials in earnings within or among racial/ethnic groups.

However, empirical studies of the socioeconomic attainment of minority groups require exploration of not only the contextual factors but also the individual characteristics and their interrelationships. In the past, disaggregation, aggregation, dummy treatment, regional or case study, are some of the common tools investigators have applied to explore the relations between the individual factors and the contextual characteristics. As noted in an earlier chapter, the conclusions based on such procedures may be misleading.

This dissertation assumes that both individual and contextual variables operate to determine the earnings of Chinese workers in the U.S. labor market. HLM techniques (Bryk and Raudenbush 1992) are the ideal tool for such analyses. With HLM, investigators are able to integrate not only the different traditions but also various forces determining the earnings and measure the effects with more efficiency and precision. HLM can not only allow one to take into account the contextual effects while gauging individual outcomes but also to partition within-unit variance from between-unit variance and reveal the degree to which the individual and contextual characteristics influence individual outcomes, respectively. Moreover, the HLM techniques can neatly produce the cross-level interactions. In a word, HLM techniques allow for greater insight into the earnings mechanism of Chinese workers than other methods conducted at a

single level. Using these multi-level modeling techniques and the latest census data, this dissertation contributes to the understanding of how individual and contextual factors affect individual earnings that can not be achieved otherwise.

Despite the advantages of the hierarchical modeling techniques, there are some limitations in this study. First of all, because a series of arbitrary restrictions were applied in selecting the study samples, the incurring selection bias may distort the statistical analyses to some extent. At the same time, because of smaller sample sizes, many MSAs have been excluded from the analysis. As a result, the conclusions may not be generalized to other metropolitan areas. Second, although the census bureau provides the largest sources for studying socioeconomic achievement of individuals, they do not provide all variables that may contribute to the understanding of the earnings process. For example, there is no information on the labor market experience, one of the major human capital variables. The traditional method of deriving labor experience, i.e., current age minus years of schooling and minus 6 (pre-schooling years), assumes that all graduates can find a job immediately upon graduation and that there is no employment disruption for both men and women after starting to work. This assumption could be problematic, especially in times of a downturn economy and when one has discontinuous employment history. Another problem associated with this operationalization is that it fails to distinguish between labor force experiences obtained in a foreign country and U.S.-specific work experience, which may pay the workers differently in the labor market (Friedberg 2000; Zeng and Xie 2004). This problem can be especially serious for Chinese Americans, a majority of whom are foreign-born.

In addition to labor market experience, the census has omitted other potentially useful variables, such as the place of education, and family background. It does not distinguish the undocumented from other immigrants either.

Census 2000 went even further to leave out the children ever born variable that had been in censuses of past decades. As a result, this dissertation used "Presence and age of own children" to approximate the "children ever born" component in order to derive the labor force experience of women workers. In order to test the validity of this variable, women workers (N=12,477) were isolated from the largest of the three Chinese groups--naturalized citizens. A dummy variable was created for those aged 25 to 39, and those aged 40 to 64 were the reference group. The same five HLM models (then gender variable MAN was excluded) were fitted to this subset. The results (not shown here) show that Chinese women of aged 25 to 39 earned 6-8 percent less than those aged 40 and above across the five models. While labor experience in the original models with both male and female workers included showed positive and statistically significant effects on earnings, the current models show that labor experience consistently shows negative but not statistically significant effect on wage earnings of Chinese women. This suggests that younger women tend to have more own children present while older women do not, and thus, the labor force experience derived from the "Presence of own children" may have produced more favorable results for older women workers than for younger women in the original earnings equation.

The third limitation is that although the economic census data provide information on the racial/ethnic ownership of business establishments, they do not have

data on the workforce composition. This renders it impossible to distinguish between ethnic and enclave businesses as described by Logan and associates (1994) and Wilson (2003) and to further gauge exactly how an enclave economy affects the earnings of Chinese workers.

Fourth, due to the cross-sectional nature of the data used in this dissertation, it is not entirely clear how occupational segregation and residential segregation affect the earnings attainment of individual Chinese workers. Also, the index of dissimilarity, a symmetrical measure of occupational distribution, does not allow one to distinguish the advantaged from the disadvantaged group.

The relationship between socioeconomic status and residential location in an ecological locality also poses a kind of chicken-and-egg question because the location can be both the cause and/or result of one's socioeconomic mobility. The literature of urban ecology seems to treat it as a cause by suggesting that location may limit the opportunities of minorities to move into more rewarding institutional settings and channel them to less rewarded firms and industries (Hawley 1944; Duncan and Lieberson 1959). This is especially true in earlier times when cities or large labor markets were highly differentiated from one another, and the limitations of local transportation confined people to work where they lived, thus hampering their employment opportunities.

Residential location can also be a powerful indicator of an individual's socioeconomic success. Indeed, "The urban neighborhood becomes a highly visible manifestation of the status structure, and individual occupational careers come to be

mirrored in one's residential movements. A home is not just where you live; it is a location in a well-developed status ecology" (Laumann, Siegel, and Hodge 1970:524). Consequently, with only cross-sectional data and census statistics, it poses a challenge to distinguish the cause from the effect, or vice versa.

Despite the weaknesses mentioned above, this study shows the usefulness of the multi-level approach that takes into account the human capital and structural perspectives, and the corresponding individual and contextual factors. Future study should either take care to avoid selection bias or test the validity or representativeness of the selected samples at the very beginning. After that, one can proceed to conduct appropriate statistical analyses.

Limited by the data, this dissertation controls for only a limited number of both individual and contextual variables. As such, future research should not only refine current variables at both the individual and MSA levels, but also include other characteristics at both levels that may potentially shape the individual economic outcomes in the labor market. Some individual-level characteristics such as education can be further refined as those earned in the United States and other countries; the measurement of labor force experience should not only take into account employment history but also distinguish between the work experience accumulated in the sending countries and the United States. More work is also needed on the measurement of social capital at both the individual level, such as number of relatives or friends, and at the aggregate level, such as cultural norms, networks, the number of years an ethnic group has resided in that area, the number of ethnic guilds or trade associations, and so forth.

Also for contextual factors, the industrial structure and diversification of a labor market, migration rate, poverty rate or dependency ratio, should also be examined. In addition, a higher-level of contextual characteristics should be explored. For example, different states may have different policy and regulations that affect individual earnings attainment in one way or another.

The multilevel modeling results for this dissertation show that increases in the relative sizes of both Chinese ethnic population and Chinese-owned businesses in a labor market do not seem to help native-born and foreign-born Chinese workers to convert their human capital into earnings. This suggests the existence of enclave economy characterized by easy entry and low-wages. It is also possible that the ethnic business owners discriminated against their foreign-born co-ethnics either because of their immigrant status or their nontransferable human capital. As such, appropriate data are needed in order to probe into the right causes. At the same time, longitudinal data is also needed to disentangle the relations between earnings and residential concentration (Chinatowns). For this kind of research, a combination of quantitative and qualitative research will be the best strategy.

Finally, as indicated in the empirical literature, the same contextual factors may have different effects on workers of different racial/ethnic origins (Frisbie and Neidert 1977; Wilson 1996; Tienda and Lii 1987; Cassirer 1996). As such, other racial/ethnic groups, particularly non-Hispanic whites and Asian American groups who share a similar immigration history, should be included in future study in order to see if they are subject to the influences of the same contextual characteristics.

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Presentation

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